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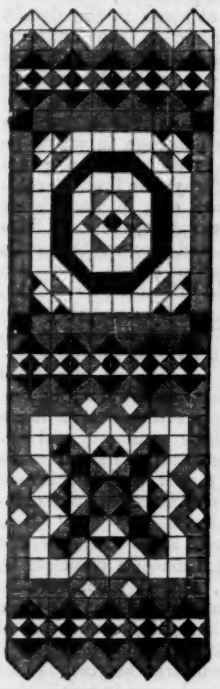


The Persian Collection at South Kensington.

ON Thursday there was opened to private view, at South Kensington Museum, a collection of no small richness and interest, which has been in process of formation for some three years, and is, even now, not entirely complete, as a considerable number of specimens are still on their way, though the bulk of the collection is now arranged in the space allotted to it, in the north cloister, parallel to and beyond the refreshment-room corridor. The collection, as our heading implies, is illustrative of the art of Persia, and may be said to have grown to its present extent by a kind of "composition and resolution of forces" in collecting. Persian art has been, of course, represented at South Kensington, to some extent, for a good while past; and when Major Murdoch Smith, some little time ago, returned from a Government mission in Persia, and, having paid considerable attention to the art of the country during his visit, inspected the Persian objects at South Kensington, he succeeded in convincing the authorities there that what they had *not* got was much more the object of remark to a traveller acquainted with the country, than what they had; though this included some admirable articles forming important items in the new collection. One result of this was, that Major Smith was authorised, on revisiting Persia, to purchase, to a certain rather limited extent, on behalf of South Kensington. The gallant major, however, made such excellent use of the trust thus imposed upon him, and showed so good and in every way valuable a return for the funds entrusted to him, that his commission, from being limited, speedily became practically nearly unlimited. While the major was thus, in a double sense, serving his country abroad, M Richard, a French gentleman, who had been long in Persia, and had formed a large collection, hearing that South Kensington was interesting itself so much in Persian art, offered his collection for sale, preferring to realise rather than have the trouble and risk of conveying it home himself. Some other privately collected articles also came into English hands in a similar manner. The difficulty and risk of conveying these articles to England have been considerable, and breakages on the way have been numerous enough, in the porcelain and earthenware department, to keep a man in employment riveting for two months. However, these difficulties have now been fairly surmounted, and a large and well-arranged collection is added as a new attraction to the great establishment at South Kensington, now under the able control of Mr. Cunliffe Owen.

The main divisions of the collection are porcelain and pottery, metal work, and textile fabrics; there are also to be seen specimens (very fine ones) of wood carving, arms and armour, painting, illuminated manuscripts, and musical instruments. These latter sections, however, are less numerous and less fully illustrative than the first-named three departments; or, in regard to one or two of them, there is perhaps less to illustrate. The objects of ceramic art are arranged in cases down the centre and south side of the room, and the textile fabrics in cases against the north wall, opposite the light. Looking first at the pottery work, we find at the top of the room a collection of fragmentary wall-tiles, with inscriptions on a large scale, evidently forming portions of ornamental "strings" in buildings, and at once recalling the similar use of tiles in Arabian and Moorish, indeed in Saracenic architecture generally. The close connexion between Persian and Arabian art is manifest, in fact, in a great deal of the work here, the metal work especially; while the wood-carving and inlay have equally close relations with Indian work. To proceed, however, with our examination of the pottery: this may be divided, as far as process of manufacture goes, into two main classes,—that of which the basis is coarse earthenware, with an enamel poured over it, and that which partakes of the nature of porcelain, is translucent or semi-translucent, and glazed. Some of the latter, the specimens of which are chiefly in the side cases, shows a characteristic treatment in the shape of pierced ornament, in which the glaze is left, and forms a transparent filling to the piercings, with a rather unusual and pretty effect. A distinct style of ornamental effect in a good many of the specimens at the upper end of the room is that which consists in giving a metallic lustre to the ornamental design, or to the surface generally. A large proportion of the objects exhibited, however, are in a style strongly resembling Chinese ware, with designs in strong blue on a white ground. Their Chinese origin, in regard to style, is further indicated by the presence of Chinese letters and inscriptions, used ornamentally, and apparently copied by the Persian workmen. This class of ware is the best executed; but our admiration for it, in regard to artistic quality, is not on a par with that expressed in the hand-book written by Major Smith for the museum authorities. Its decorative effect, regarded as a class of objects for adding to the combination of colours in a room, is very good. Its artistic qualities, when considered more minutely as decorative design *per se*, are not of a high type. The great admiration for this sort of ware at present is, in fact (though we shall probably scarcely be pardoned for saying so), a good deal an acquired, we will even venture to add, an affected taste. What enthusiasts for this style of ware mean by talking of the "admirable drawing" of the designs we do not pretend to understand, since it is mostly such as would be laughed to scorn (we hope) if committed by any pupil in the Art Department. A good many of the objects classed by Major Smith as of an inferior and declined style in the art, are so in regard to mode of execution and richness of surface and tone perhaps, but are superior, as design, to the earlier specimens. We may mention the three large rice-bowls side by side in one of the cases, one of which is engraved opposite page 12 of the Hand-book. The centre one of the group, however, is finer and more original than the one engraved; but all are superior in point of design to a good deal which is put in advance of them in the Hand-book. In the earlier work, in fact, the execution and the material are better; in the later work the design is better. The large flattened pear-shaped vase, with a modern chased brass top, in one of the side cases, strikes us as one of the best objects here; it is decorated in red and blue design, and there is some other work in the same style in this case. Some jars, called "Siculo-Arabian" work, in one of the centre cases, with mixed tones, including a rich brown, are very effective as combinations of tone, and with a coarse vigour in the design of the ornament. But in the main we regard this collection of pottery rather as a highly interesting historic and illustrative exhibition, than as furnishing much matter for instruction to the modern artistic mind, except merely as a matter of trade, and as long as the pottery mania lasts. In one respect, indeed, Persian is shorn of a glory, in the recent arrangement and classification of her pottery at South Kensington. The style of free-flowing leafage decoration, in fine colour, displayed on the surface of large circular plates and dishes, which has been long counted as Persian work, and is really fine, has been discredited as Persian during the recent fuller investigation of the subject, and is now separated from the Persian section, and classed as "Rhodian." There is nothing in a name; but this work, even in the specimens shown at South Kensington (and they are by no means the best we have seen) is far superior in artistic effect and suggestiveness to anything classed as Persian pottery in the new collection; and to prefer the Persian blue and white to this, as a matter of art, is simply collectors' bigotry.

We come now from the pottery to the metal work, and here we may indulge in admiration freely. The style here, as before remarked, is essentially what we have been accustomed to consider as Arabic. It consists mainly of delicately relieved or incised geometrical design, or design which, when not obviously geometrical, is formed on a geometric basis. The general shapes of the articles here are mostly as good and artistic as the detailed design; some of them, such as the ewers, are familiar and often repeated forms; others are less familiar, and there

is much greater variety of design in regard to general form than among the pottery. An extraordinary specimen is a brass figure of a peacock, conventionally treated, with outspread tail; the whole surface is covered with minute ornament, and the breast bears an embossed face forming a symbol of the sun, with rays round it. Among objects showing very minute ornamental work, some small circular plates, a little larger than a crown-piece, and used as talismans, may be mentioned; and two of the finest specimens of this class of work are the two large circular trays in an adjoining case, in which the decorative work is of the highest and richest type. These formed part of the former Persian collection; and we may mention that the two were purchased for 8*l.*, an extraordinarily low price, and far beneath their real value; which we may take, perhaps, as an indication that, in spite of occasional grumblings about expenditure, South Kensington is no such extravagant place after all. In regard to the Persian collection, at any rate, it would seem to us that much more than money's worth has been secured, taking the aggregate of the whole. Before quitting the metal work, which, in fact, deserves far more than the few words which time and space permit us to bestow on it, we remark on the great beauty of the case of zinc-work and tinned copper, placed near the principal cases of brass work, and forming an effective contrast to it. We may also observe that in instances where metal work of the present day is placed in juxtaposition with old work, it is remarkable how much the modern Persian artist keeps up the style and feeling of the old work, so that there seems little to choose between them. The Persians will soon get over that, however, when their communication with Europe becomes closer and more constant, and they, like the Japanese, will take to Europeanising just as earnestly and systematically as a good many Europeans have taken to Japanising. It is a real pity, however, that in the progress of intercommunication the originality and individual character of national arts should continually be absorbed and destroyed; but it is apparently a result we must count upon, and which no power can prevent: good reason for making representative collections of such arts while they are still to be found in their real life and vigour.

The woodwork represented here brings us, as we remarked, very close to India, and in regard to the inlay, that style of delicate minute Geometric work in ivory inlay, we are disposed to say that the fine examples here are superior to most, if not any, Indian work of the kind that we have seen; equal in execution, and superior in fancifulness of arrangement. The case of sherbet-spoons, entirely cut, except the bowl portion, in the most delicate and almost lace-like openwork carving, of beautiful design, is a thing to hold up one's hands over. Among specimens which may be classed with wood-carving is a dervish's wallet, consisting of a double cocoa-nut shell elaborately carved in relief; the material is quite black, and looks like ebony carving. This is nineteenth century, and certainly as far from our usual ideas of nineteenth-century work as anything could be. Among the illuminated books which are placed near here we are more taken with some of the older and less gaudy than with the later specimens. There is one copy of the Koran ascribed to the tenth or eleventh century, with each line of writing separated from the next by an interspace defined by a thin blue line, and in which interspace a circular gold seal or symbol is stamped here and there at irregular intervals: the effect is unusual and piquant.

Looking at the textile fabrics, which constitute one of the most important portions of the collection both as to quantity and quality, we observe that the distinction between modern and old work is more discernible in these than in the wood and metal work. Some of the newer fabrics, carpets, &c., are too raw and pronounced in colour, and in this respect cannot compete with contemporary Indian work. The first thing we notice, returning the reverse way up the room, is the beautiful though simple work on a linen veil in a small case; a little panel, so to speak, of delicate open-work in it, has a charming effect. The various "prayer-carpets" shown here are very good in colour, design, and workmanship, and show all the same characteristic of the representation of a Saracenic foliated arch with diaper ornament in the spandrels over it. This evidently simulates or recalls the gateway of the mosque; and it is curious to compare this with the precisely analogous habit in modern England of decorating articles in connexion with devotion—hymn-books, prayer-books, &c.—with suggestions and imitations of bits of church furniture. One of these prayer-carpets, one of the largest and richest here, has in addition two open or uplifted hands embroidered on it, as if symbolical of devotion. We notice as we pass up the row of cases, in one of the smaller ones, "a tunic for a lady," early seventeenth-century work; the exterior a diaper of leaf-shaped forms something like a Cashmere shawl on a small scale, and with most rich colour and minute work; the lining consists of an orange ground powdered with sprigs. A more picturesque and beautiful costume to set off a dark Eastern beauty it is impossible to imagine: the image of the "dark-lidded Persian girl" in such a setting as this is one to turn the head equally of the artist and the man, even in imagination. Among the further beauties of this part of the collection are some very fine (modern) carpets in white quilted cotton with a flowing foliage design over them in green, with coloured, mostly scarlet, blossoms; the lines of these designs are admirable for freedom, and the colour effect of the whole excellent, though too light and too easily soiled for our notion of carpets. Some of the best stuffs here, and the richest and most characteristic in style, are the pieces in diagonal patterns which form what was mostly used, in the old Persian costume, for what would have been the ladies' petticoats had they been Europeans; but which, not being petticoats, are unmentionable. They serve to show what a rich profusion of colour a Persian drawing-room must have displayed in the days "of good Haroun Alraschid." But the love of the Persians for fine dress, in both sexes, dates from long before the time even of that worthy. There is a passage in Xenophon, if we remember rightly, narrating how in an engagement, the Persian soldiers, in obedience to some order, jumped down into the mud "in their embroidered trousers." As to the paintings ranged above the fabrics, mostly portraits of Persian ladies, they are bad enough in regard to form, but show very good and minute treatment of decorative details of dress, &c. The best bit of figure-work we noticed in the collection is in the two small paintings of the Virgin and Child on a couple of minor frames in a case at the west end of the room; these have the air, however, of being an attempted imitation of European painting.

We are asked to mention, and willingly do so, that besides the special private view by invitation on Thursday, this day (Saturday) is specially set apart for the first visit of students of district art-schools to the collection; the first time that such a special recognition has been made, on such an occasion, of a class of visitors to whom any new work of this kind should be specially interesting.

In concluding our remarks we may just observe that the expense gone to in making such large additions as this to our great art museum is not one to be grudged because part of it comes indirectly from the pockets of some who may, or think they may, never reap any benefit from it. Not only does the artistic taste of the whole country benefit in the end by an establishment which affords such opportunities of study, but much is done to make the provinces direct sharers in this benefit, by lending objects for a certain term (three months) to provincial art museums and exhibitions. Some of our readers will be surprised to learn that, during last year only, 10,000 objects were lent to thirty-nine different localities. Surely such a statement is sufficient to take away one weapon at least from the hands of those disciples of an over-acted economy, who, if they could, would reduce art itself to a matter of £. s. d.

MICHELANGELO AS AN ARCHITECT.

CONSIDERATION of space compelled us to break off our previous notice of Mr. Heath Wilson's "Life of Michelangelo" before giving any attention to the portion of the volume which refers to the artist's work as an architect.* In resuming the consideration of the "Life" at this point, it must be admitted that it is not in his architectural achievements that Michelangelo was most successful. At the same time, this phase of his career is one which could not possibly be passed over in these columns as of only secondary interest.

In connexion with this part of the subject, we may here call attention to the fact that the *Gazette des Beaux Arts* of January contains a brief but excellently-written article by M. Garnier, the eminent architect of the Paris Opera-house, on "Michel Ange, Architecte." The critical judgment there expressed is pretty much the same which, as we think, every competent and impartial critic must in the main adopt in regard to the work of Michelangelo as an architect. M. Garnier, contributing to a number of the *Gazette* which was entirely devoted to Michelangelo, laments, in fact, the invidious position in which he is placed, in being the only contributor to that number who cannot freely indulge in enthusiasm, but is compelled instead to adopt the tone of an apologetic critic. The ordinary triad of attributes, "painter, sculptor, and architect," assigned to Michelangelo, conveys, as he observes, a false impression to the unthinking reader, as if the master's achievements in these three arts were to be "bracketed together" as of equal greatness and importance; whereas in fact the artist, perfectly at home in the details of sculpture and painting, in the accurate knowledge of the anatomical construction and minutiæ of the figure, was, when he came to practise architecture, in the position of a man with grand ideas, but with too little knowledge of the structure of the language in which he wished to express them, to do himself any real justice. "It would seem," says the French architect, "as if he sketched out, in accordance with his first general conception, the main lines of a grand composition, and then wrote upon it almost arbitrarily, at various points, 'Here one may have a cornice,' and 'Here put a capital'; and so the cornice and capital are duly put in their respective places." It is a just remark, also, of M. Garnier, that the violence and abruptness of design, almost in defiance of natural principle, which is a defect in some of his figures, becomes the origin of more serious defects in his architectural design, where symmetry and mechanical conditions of construction have so much more importance; and that it leads in this case to "*ruptures d'équilibre si abnormales que les sensations en restent profondement troublées.*" This is a perfectly just judgment as far as it goes, and the whole tenour of M. Garnier's criticism is, abstractedly considered, almost unanswerable. At the same time, it must be said that the great importance of the building the completion of which was Michelangelo's crowning effort as an architect, has given it an interest scarcely second to that of the Sistine Chapel; and in considering the artist's efforts as an architect, it must be borne in mind that he took up this branch of art late in life, and that even with the small practice he had, the details of his later work show a marked improvement upon his earlier, as is evident enough if we compare the original design for the façade of San Lorenzo with that for the dome of St. Peter's; and there seems little reason to doubt that, could he have lived to pursue architecture further, and to have time and opportunity for more systematically studying it, he would have brought it under his control as successfully as he did the art of painting, in which he declared himself quite a novice when he undertook the Sistine frescoes.

Of some of the original architectural sketches of Michelangelo, copies of one or two of which are engraved by Mr. Wilson, it is to be observed that they not only are not ostensibly drawn to scale, but that there appears to be a degree of oversight as to the proportions of the parts to the eye. The proposed design for the front of San Lorenzo (p. 212), from a drawing in the Buonarotti archives, seems put together in a most random fashion. The sketch for part of the monument of Julius II. (p. 74) is even more like what we should at present take to be the work of a young pupil, so far as the architectural detail is concerned. This was earlier work still. On the other hand, the drawing for the entrance door in the Laurentian Library (p. 309), which was much praised by the Pope, is not deserving of all the censure bestowed upon it by Mr. Wilson, if, as we suppose, his remarks refer to the drawing which he engraves. The columns are, indeed, weakly designed, but the "trabeation" is certainly not "of the heaviest kind" or "literally gigantic in its parts"; on the contrary, the whole is in very good balance. It is difficult, however, to tell whether the author, who is rather confused in his references to his illustrations, is speaking of the doorway as executed, or of Michelangelo's drawing as intended. If the actual design deserves all his strictures, it is clear that the fault was not entirely with Michelangelo, whose own drawing shows a well-considered proportion, and is cer-

* See p. 301, *ante*.

tainly in advance of the previous architectural drawings of which illustrations are given.

That Michelangelo, in addition to the title of "architect," might at one time have borne that of "contractor," is less generally known. But it is evident that his enforced occupation at Carrara in 1517, in connexion with the San Lorenzo scheme, was really that of a contractor looking after building materials, and the "getting out" of stone for the various portions of the work. Ignominious as such an employment seems for such a genius, it is not improbable that the author is correct in supposing that during this period, when he was forced to give his attention to the practical consideration of working drawings, and of fitting the blocks for the intended construction, Michelangelo gained a good deal of experience, which was subsequently to prove of value to him in his great work at St. Peter's. The selfishness with which this great genius was turned, first by one Pope, then by another, to be a mere worker-out of schemes for their own glory, though it resulted in exalting the artist far above his so-called patrons, is a fact to be taken account of in forming a conception of the conditions under which Michelangelo had to work. Pope Clement wanted to keep the artist entirely to himself; and hearing that he was besieged with commissions from others for paintings, said "Let him stick a brush between his toes and make four marks and say 'there is a picture,'" and sent him a brief ordering him to undertake no work for any one else on pain of excommunication, which was to furnish him a valid ground for declining all commissions from other quarters. Such was the Papal method of patronising a great artist.

Coming to the great architectural work of Michelangelo, Mr. Wilson observes that the drawings by the various architects successively employed on the structure, a good many of which are preserved in the Uffizi gallery, convey the idea that each had considered, not how he could carry out his predecessor's idea, but how far he could alter it. This showed a deficiency in artistic morality, no doubt, but it is characteristic of the restless and ambitious spirit that reigned in the art world of the Renaissance period. Michelangelo, however, seems to have had considerable admiration for the original scheme of Bramante: so much so as to make it probable, one might say, that he would have adhered as far as possible to that plan had he been the direct successor of Bramante on the work. In a letter dated "Rome, 1555," after observing that Bramante had laid out the first plan with clearness and precision, making the building isolated and with daylight all round, he proceeds to say that Sangallo (between whom and Michelangelo, indeed, there was no love lost) had, in departing from the design of Bramante, "left true architecture on one side."

"He, with that circle which he makes outside, in the first place deprives the design of Bramante of light; and not only this, but in his own there is a want of light above and below, with so many hiding-places as to provide convenience for the performance of the worst crimes, for hiding convicts, coining false money, seducing foolish nuns, and other abominations; so that in the evening, when the church is to be closed, at least twenty-five men would be required to look round and search that no one remained hidden, and they would find it a difficult task. There would be this other inconvenience, that in the circuit which the model makes outside the building of Bramante, it would be necessary to take down the Pauline Chapel, the rooms for plumbing, the court of the Ruota, and many others; I doubt even if the Sistine Chapel could escape entirely. With regard to the portion of the outer circle, which is erected, and which they say cost a hundred thousand crowns, this is not true, for it could be made with sixteen thousand; and by taking it down there would be no great loss, for the stones in which it is built and the foundations come most conveniently to hand, and the fabric would be improved to the value of two hundred thousand crowns, and three centuries of duration. This is what appears to me, without prejudice, *for to me to conquer is loss.* If you can make the Pope understand this you will do me pleasure; at present I do not feel well. Yours, MICHELANGELO.

Adhering to the model of Sangallo, it follows that all that has been done in my time must be taken down, which would be a very great loss."

There are several points of interest in this letter. It affords evidence of the practical common sense which Michelangelo combined with his greater qualities; while his representation of the probable evils resulting from the intricacy of Sangallo's design affords a curious instance, given quite naturally and *en passant*, of the violent and licentious character of those great days of æsthetic cultivation. The sentence we print in italics is significant of the writer's forebodings and previous experience as to the difficulties and vexations which attended an artist favoured by Popes and regarded with jealousy and envy by inferior men. The author prints in juxtaposition with this Sangallo's letter of report when he had previously been appointed to the same office. Among his objections to the building, in the motley state in which it then was, it was stated that the external Dorio pilasters were twelve diameters in height (!), and must be altered to a right proportion. Which of the preceding architects was responsible for these attenuated pilasters there is no evidence to show. He complains also that the nave, if carried out as it has been begun, "will be so long, high, and narrow that it will be like a lane." The confusion of Babel seems to have had its counterpart in that of the great modern monument of human building ambition.

Mr. Wilson's criticism as to the error of carrying a colossal order of pilasters up to the front, and designing the fenestration in three stories behind it, and his remarks as to the ill effect of the large-sized details of ornament, are, of course, what every one is agreed about now. He observes that in the use of enormous shell ornaments Bramante had anticipated and indeed gone beyond Michelangelo, for among his sketches in the Florentine Gallery is one which shows that "he contemplated a shell big enough to serve as the vault of an entire chapel. This fashion lasted for some time in Rome, and is observable in a number of buildings there." The author's remark that Michelangelo's total neglect of landscape, whether generally or in detail, in his paintings, must have shut him out from many suggestions for ornamental work, has some truth in it, and assists in explaining why a genius generally so original should have been reduced, in this branch of design, to copying the mannerisms of the corrupt Classic architecture of the time. "In the architectural ornaments of Desiderio da Settignano may be observed the most exquisite ideal treatment of familiar plants which grow in Tuscany. By such simple means he thus excelled Michelangelo, and enriched art with novel and beautiful forms and ideas." On the other hand, Michelangelo seems to have regarded the general design of architecture as directly founded on nature, as appears from a curious letter, quoted p. 488, in which he explains to his correspondent that one part of a building should be a counterpart of another, just as "one hand is bound to resemble another." Had he applied this principle less to the general design, and more to the ornamental detail of his buildings, the result would probably have been better.

An engraving is given of a slight sketch executed with pen in bistre, and preserved in the Florence Gallery, giving a view of St. Peter's in progress during the time of Michelangelo. The drum of the dome is being constructed, and a great block of stone in process of being lifted by very primitive-looking machinery. A portion of an older building is shown still in existence under the dome, and reaching nearly to the springing of the nave and transept arches. The sketch gives a very real idea of the bit-by-bit nature of the work, though, as Mr. Wilson observes, it conveys no notion of the scale of the building. It is noticeable, in looking at the design of the cupola as originally made, and which was spoiled in more than one respect in execution after the death of its designer, to how far truer a feeling for architectural line and proportion Michelangelo had arrived, at the time he made this design in his old age, than any of his previous architectural schemes evince. This is the more remarkable, as he seems to have come to the work so unwillingly. His complaints that he is not an architect, and that he had been compelled to undertake the work against his will, are frequent. That he gradually acquired a great interest in it is natural enough, after the trouble he had gone through in designing it, endeavouring to get his subordinates to understand and carry out his ideas, and contending with the accusations of those whom Vasari calls the "Sangallo sect" among the "deputies of the fabric," who, though they were his real masters and officially responsible to the Pope, the high-handed architect treated as so many puppets, and refused to give them an explanation of intentions of which he probably thought they were no competent judges. Michelangelo's own high sense of responsibility, however, in regard to the fabric committed to his care, is shown in the following letter addressed to Vasari (but not printed in his Life) in reference to the efforts of Duke Cosmo to induce him to return to Florence:—

"I was placed by force over the fabric of St. Peter's, and I have served for eight years, not only as a free gift, but to my great loss and discomfort; now that progress has been made, and now that there is money, and that I am about to turn the cupola, if I departed it would be the ruin of the fabric, it would be a reproach to me throughout Christendom, and a grievous sin on my part. Therefore, my dear Messer Giorgio, I pray you to thank the duke for his noble offers which you have written to me about, and to beseech his highness that, with his grace and permission, I desire to remain here till I can leave with reputation, honour, and without sin."

What adds to the force of this letter, as evidence of his devotion to the successful issue of the work he had undertaken, is a letter on the same subject dated only a month later (June, 1555), in which, after repeating the same argument of his desire to go on with the work of St. Peter's till it was completed, "so that it might not be altered and another form given to it, for did I depart before this, it would be a cause of great misfortune, shame, and crime"; he adds, "You must see in my handwriting that I touch the twenty-fourth hour, and no thought is now born in my mind in which death is not mixed. *God grant that a few years of labour may yet be mine.*"

The "few years of labour" thus pathetically craved were indeed his; but he was denied the satisfaction of witnessing the completion of his work, and of preserving his design intact from alteration. It may be considered fortunate, indeed, that the dome was built so nearly on his design as it is; but the omission of the graceful curved buttresses round the drum is certainly a great loss. It is probable, too, that in regard to the construction of the dome the premature loss of its architect had a bad effect, for the section of the model is a much more stable one than the section actually carried out, and exhibits provision for ties which were neglected in the actual construction, and had to be added afterwards to keep it in security. We may conclude our comments on Michelangelo as an architect, suggested by Mr. Wilson's "Life," by citing the reflection which M. Garnier makes, in the article in the *Gazette* before referred to, that "Michelangelo has been saluted with the title of the grandest of painters and most impressive of sculptors, and that he is still far above the praises that have been bestowed on him in these capacities. Let him, however, be saluted as 'architect' also, for, under the influence of his name, the populace will perhaps come to believe presently that architecture is really an art, and that for its successful practice some degree of accomplishment is required!"

One or two other general points of interest we may just touch upon before dismissing finally, and with congratulations, Mr. Heath Wilson's interesting and valuable contribution to the history of the artist. In the critical judgments on special qualities in Michelangelo's art we often concur. They are mostly very just and discriminating, not without, in some cases, novelty and originality. With the character of his hero, however, it is evident that he has but imperfect sympathy, and that the strong and fiery element in Michelangelo's nature is a doubt and a puzzle to him. For instance, he draws moral reflections (p. 18) in regard to the well-known Torregiano outrage; that it was a pity the greater artist did not learn from this event the value of peaceable words, and remember the lesson through life. Now, there is plenty of evidence, some of it amongst the new matter supplied by this very biography, that Michelangelo was capable of great self-control and patience under vexations which were the result of circumstances only. That he was not always equally patient or submissive with persons who, through malevolence, little-mindedness, or sheer stupidity vexed his soul, is simply to say that he was not one of those respectable and genteel geniuses who go through the world simpering and bowing to every one, and making no enemies anywhere; and if he had been such, he would not have been Michelangelo. The personal and family pride of the artist is a point which this volume strongly brings out, and it must certainly throw a new light on his character for those who have always thought of him simply as a great artist. It is evident he thought of himself as a man rather than an artist, and was possibly the greater and loftier artist in consequence. In a letter to one of his family, May, 1548, he says, "Tell Fattucci not to address, *Michelangelo, Sculptor*, for I am not known but as Michelangelo Buonarotti; if a Florentine citizen wishes to have a picture painted for an altar, let him find a painter, for I never was painter or sculptor, as those who make merchandise. I have striven for the honour of my parents and brothers: true, I have served three Popes, but I was forced to do so." The direction about the address reminds one of Congreve's refusal to be called on by Voltaire as "a literary man" (as a gentleman, he should be happy to make his acquaintance); but the contemptuous touch about

"three Popes" is in pure Michelangelo vein. Writing to the same correspondent, his nephew Lionardo, who was about to marry, he is urgent that he should first procure a residence worthy of the family name; he offers to forward the money for a handsome house (p. 498),—"for I think that a handsome house in town does more honour to a family, because so observable, than country possessions. We are citizens descended from a very noble race. I have all my life done my best to resuscitate my family; but I have not had brothers to help me. However, exert thyself to do what I tell thee, and let Gismondo return to live in Florence, that I may not be made ashamed by that which they say to me here, that I have a brother who drives oxen." This kind of anxiety for the family honour, which he seemed to think had fallen below its hereditary rights, is at least a pardonable, if not a praiseworthy form of social pride, and quite above the vulgar idea of "keeping up appearances." About the latter object, indeed, Michelangelo seems to have troubled himself as little as well could be, in regard to his own personal *ménage*. The beautiful episode which his friendship with Vittoria Colonna forms in his life, the noblest thing in a life full of noble things, receives no fresh light from the new biography. We commend it, however, to the attention of all who are interested in the great painter of the Sistine frescoes; there is much interesting matter that we have not been able to touch upon; and if the author does not perhaps fully appreciate Michelangelo as a man, he shows for Michelangelo as an artist an enthusiasm none the less valuable for being tempered with a little critical discretion.

THE AMERICAN CENTENNIAL EXHIBITION.

Two hundred and thirty-six acres of the most beautiful and undulating portion of West Fairmount Park have been inclosed for the purposes of the Main Exhibition. This inclosure has thirteen entrances, corresponding in number to the thirteen original States.

Other inclosures are for exhibits of live stock, trials of agricultural implements, and international matches of various kinds. The main buildings* are five in number, but with the special buildings which have been constructed in answer to demands for space, and with the pavilions of the various States and commissions, the number of buildings is considerably over 100. The Main Exhibition is finished and decorated, and is being rapidly filled with the various exhibits. The space is divided among thirty nations. The United States, Germany, France, and Great Britain are in the centre, each occupying one of the four great towers with the adjoining space. The visitor is agreeably surprised at the extreme lightness of the interior, the size of the iron columns which support the structure being only 10½ in. square. The colouring of the roof is a ground of very light blue, the edge of the slope above the cornice being decorated with a border of lotus in vermilion. The principals and the rods are of buff picked out with lake. The columns and framing have a ground of sage green, with bright streaks of vermilion with blue and yellow stencilling and scroll-work capitals of buff. The architraves are also of buff, with stencils of blue and white, and black and white. In each alternate section is the monogram C.E. in black and blue upon a vermilion ground. On every third capital is the date 1776. The transept is similarly treated. The circles in the upper part of the side windows have painted linen panels with rather poor representations of the arts and sciences.

As yet there is little sign of life in the portion taken up by the United States. Chili is erecting a polygonal pavilion, Gothic in shape, with gables. Japan is putting up a number of handsome screens on which to display its exhibits. The cases of Egypt adjoin Japan.

The Spanish have erected a lofty enclosure, the façade fronting the main avenue reaching to the tie-rod of the roof principals. The centre pediment will be filled with an allegorical painting of "Spain withdrawing the curtain that overshadowed the New World." The remainder of the façade will be decorated with the portraits of famous Spaniards connected with the discovery and conquest of America. Queensland, Sweden, and Norway are enclosing their spaces. Cases from England are rapidly arriving and being put in place, but there will be no enclosure.

To the north of this main building is a hall being built for the exhibition of wagons, carriages, cars (train or tram), and stoves. Further east the Permanent Art Gallery is approaching completion. To the north of this it has been found necessary to erect another art gallery of the same size, this will be only temporary. The works of art to be exhibited by the United States are chosen by a committee from the preliminary exhibition held at New York, Boston, and Philadelphia. On the granite pedestals of the Permanent Art Gallery are two colossal groups in bronze discarded from the Continent, and presented by an enterprising American to the Park Committee. These and the "land" colouring of the main building scarcely do credit to the national taste.

To the east of the bronze groups is the Photographic Art Gallery. The Machinery Hall, which has been finished for some time, is a perfect labyrinth of foundations for machinery.

The huge engine erecting by the Corliss firm of New York will supply the motive power. It is one of 1,400 horse-power, with a driving-wheel weighing 56 tons. Great assistance has been rendered in handling these masses of metal by the English locomotive cranes made by Messrs. Appleby. In the Annexe is a large open tank, 160 ft. by 60 ft., and 7 ft. deep, for supplying the hydraulic machinery. At the south end will be a "cataract," with a fall of 30 ft., worked by the centrifugal pumps of Messrs. Andrews Brothers, of New York, raising 30,000 gallons per minute. Parallel with this annexe are the several boiler-houses, and south of that allotted to Great Britain is the Shoe and Leather Exhibition Building. West of the Machinery Hall, on Fountain-avenue, is a special building, 526 ft. by 80 ft., for the exhibition of saw-mill machinery. It will contain one stone and seven timber saw-mills.

The horticultural building is in the hands of the decorators; the conservatories are already filled with tropical plants and lemon and orange trees laden with fruit. The adjoining slopes have been allotted in sections to North American, European, North African, and South American States, for the exhibition of trees and plants. Agricultural Hall would now be ready for exhibits, but the framework of one of the wings was blown down. The aquarium will be commenced at once, the tanks running along the west side of the northern end for 450 ft. Adjoining the United States Government building are the model hospital, hospital-tent, and laboratory. In the grounds are the offices of the Commissions, the various State pavilions, fire-engine and hose stations, restaurants, the Centennial National Bank, with access from within and without the enclosure; a Moorish villa, which has arrived in sections from Morocco; a pretty Swedish school-house, wholly of timber, covered with shingle; the Japanese dwellings, the Bartholdi fountain and Catholic Total Abstinence Union fountain, with statuary from Austria; the New England log-house and modern kitchen, the World's Ticket Office, dairy, and Vienna bakery.

There are also miniature representations of the topographical and other features of Italy and Switzerland, and of the cities of Jerusalem, Paris, Naples, and Mexico, the plan of the latter occupying a space of 330 ft. by 232 ft.

The approaches from the city cross the Pennsylvania Railway. The company are finishing several new iron bridges, carrying the road over its main line.

The Centennial Depôt is opposite the principal entrance. New roads are made and buildings are springing up in all directions, the most prominent being a theatre, and the Globe and United States Hotels, the latter built by Mr. Dobbins, the contractor for the main Exhibition buildings, in little over three months. It remains principally with the home exhibitors and the United States Custom-house officers whether everything will be ready by the 10th of May, but the Centennial Commissioners have everything in their power to make this stupendous show a magnificent success.

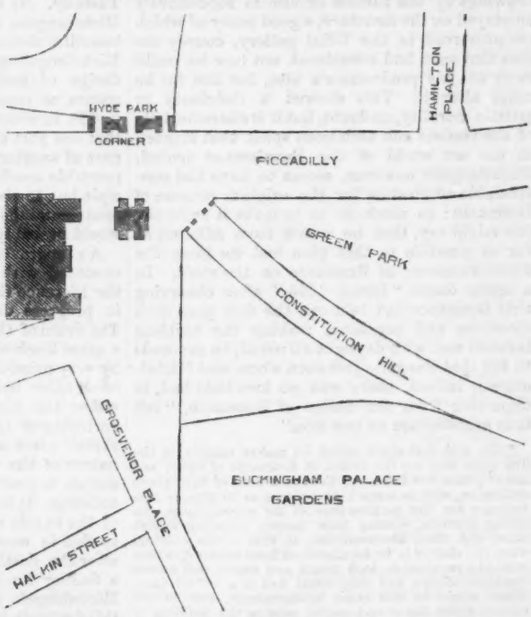
Philadelphia.

* See p. 111, *ante*.

THE PROPOSED IMPROVEMENTS AT HYDE PARK CORNER.

SIR,—The proposals of Mr. Fergusson for the accommodation of the traffic at Hyde Park Corner appear to me to be in most respects admirable, and certainly worthy of the most serious consideration. The widening of Grosvenor-place at its junction with Piccadilly, as suggested by him, would not only successfully solve the vexed question of the "Traffic at Hyde Park Corner," but it could not fail to prove, in point of effect, an immense public improvement.

There is, however, one part of Mr. Fergusson's plan which I think would be extremely undignified and unsatisfactory, viz., the termination of Constitution-hill in Grosvenor-place at the point where the little footway now exists. Admitting that the question of the respective levels of Constitution-hill and Grosvenor-place can be arranged, the former would, nevertheless, take an awkward turn into Grosvenor-place at the lower level, involving the rapid ascent of the latter up to the higher level of Hyde Park Corner. A very much handsomer, and as it seems to me simpler, plan would be to continue the line of Constitution-hill from Buckingham Palace, in what would be a very gentle curve, and with an easy gradient, so as to let it terminate in Piccadilly, opposite Hyde Park Corner. In this way, the awkward turn and dip into Grosvenor-place would be avoided, the line of Constitution-hill would



be direct instead of tortuous, the gradient would be an easy and gradual ascent up to Hyde Park Corner, instead of the steep and sudden rise in Grosvenor-place, and the entrance from Piccadilly would be spacious and handsome.

It does appear to me that no plan for this improvement is worthy of acceptation which does not provide for a direct and handsome roadway in Constitution-hill; seeing that, apart from other considerations, it forms the Royal approach from our principal park to the residence of the Queen in London.

It is true that the plan I propose in the annexed diagram would involve the cutting off of a small corner of the Green Park, and this may possibly be urged as an objection to its adoption, but I think the enormous advantages which would accrue to the public by the widening of Grosvenor-place would much more than counterbalance any such slight and inconsiderable sacrifice.

J. MACVICAR ANDERSON.

Hampstead Vestry-hall Competition.—The competitive designs for the proposed Vestry-hall and offices for the parishes of St. John, Hampstead, have been on view during the present week.

SOCIETY OF BRITISH ARTISTS.

THIS exhibition is certainly on the line of improvement. We noticed, in speaking of the last collection in these rooms, some apparent signs of a better standard of work, and in the present (the fifty-third annual exhibition) it is gratifying to note that the move in the same direction seems continued and carried further. There are works in this year's collection of real merit and interest; and in spite of the efforts of the gentleman who sends three portraits of the same model as "Olivia," "Portia," and "Beatrice," and of the other who exhibits a painting of a girl of plebeian features and rather dirty face, with a pork-pie hat and feather, as "Die Vernon," we may say that there are no examples of such horrors in the way of pictures as used to affright the nerves some years back.

Mr. A. B. Donaldson's contributions are really remarkable for their variety as well as extent of ability. We can hardly say that his large work in the first room, "An ancient Fountain" (9), satisfies us; the peculiar and rather conventional tone and manner which the artist adopts in the treatment of figures, the rather heavy execution of the clouds, give to the whole a mannered effect, and look like something between realistic and decorative painting; not quite either the one thing or the other. It is, however, a distinctly original work. The artist's small landscapes show fully his usual beauty of colour and originality of treatment, and his water-colour interior representing "The Newly-found Statue" (649) inspected by some richly-robed connoisseurs in a Florentine saloon, is a most brilliant little thing: the only slip in it is that the artist has, in his desire for brilliancy, given the statue a whiteness and glitter inconsistent with its supposed circumstances as a dug-up "antique." Going round the rooms, we notice Mr. Mann's "Watching the Lifeboat from Yarmouth Jetty" as a very good study of eager but differing expression and action in a crowd of figures. The "Bridge and Banks of Dee, Chester" (14) is a fine sunset scene, broad in treatment and with much solemnity and repose of feeling. In the "Interior of Treves Cathedral" (52) Mr. Wyke Bayliss shows his usual ability in delineating architecture, with a more aërial and real effect than he sometimes obtains. Sir John Gilbert's little picture, "A Rest by the Way" (63), is a masterly specimen of broad free treatment of landscape; it seems as if this painter, after spending much of his life in the production of works which, with all their cleverness, appealed mainly to the popular taste, has in his later years taken to painting for artists. Mr. Woolmer's "Fountain of Pleasure" (90) will hardly pass muster now; it belongs to the old school, when it was thought in keeping to give a sort of stage effect and glitter to such a classic scene; still in its way it is effective. Mr. Dawson's "Durham Cathedral" (123) also belongs to a style of landscape-painting that has rather had its day; but there is glow and power about it, though in a mannerised way. Mr. Wyllie's "End of the Day" (106), a scene on the beach of some south-coast fishing village, belongs to a higher order of art; and though not so entirely satisfactory to us as some of his smaller works that we have seen here, well deserves attention. He has found a novelty of subject in his "Wreck of a Dutch Fruiter" (121), where the whole beach is strewed with oranges,—a new sort of effect in seaside colouring, and evidently a fact. Mr. A. Goodwin shows his usual fine and poetic feeling in "The Fisherman's Island," and "After the Storm" (151, 255), the latter a remarkable piece of effect. Mr. Cattermole's "After the Combat" (158) is a capital bit in his old way. Mr. Bauerle is clever and sparkling in his interior with three children, "Be Quiet!" (276), with a garden-scene through the window. Mr. Pope's painting of a cottage girl bewailing the death of her canary (339) has excellent qualities; and Mr. E. Ellis, in "The Old Silk Mill, Derby" (385), shows a landscape, combined with buildings, of real originality and brilliancy of manner; he has rather missed the texture in the red brick-work of the mill, but the tones of the buildings are very fine, and the bright sparkling treatment of sky and water admirable, in spite of the rather raw blue of the sky. In the north-west room we notice that Mr. Grace has worked out exactly the same view of the "Thames at Great Marlow" (450) which Mr. Aumonier has familiarised us with: the time of day is different, and the treatment also; there is a great deal of refinement in the picture. Among other things to be noted as good we may mention "My Chambers" (171), by G. R. Clarke; "Autumn" (75), a small "upright," by Mr. E. Ellis, showing much feeling; "A Summer's Day on the Trent" (262), by Mr. Jas. Peel, and "The Road to the Village" (391), by the same artist; "The Troubadour" (502), a clever sketch of a man with a violoncello slung over his back, by Mr. Glindoni; "Portel Sands" (506), by Mr. Wyllie; "Attempts at Pencilling" (523), a study of a child's head, by Mr. Bauerle; "A Coast Scene" (530), by Mr. Val Prinsep, admirable in itself, but having no connexion with the verse of Tennyson appended to it; "The Village Tenor" (566), a large water-colour, by Mr. J. H. Barnes, with well-studied figures; and a very sweet and expressive portrait of a lady (618), by Mr. E. Clifford.

The exhibition will repay a visit.

THE DANGER OF INSUFFICIENT EGRESS FROM CHURCHES.

WE have to call attention to a point in ecclesiastical architecture which has of late fallen somewhat into neglect, although such neglect may at any moment involve a terrible disaster. We refer to the proper proportioning of the means of egress from a building to the largest number of persons that it can at any time contain. It will be at once admitted that the maintenance of such a proportion is a primary duty of the architect. In those prodigious structures in which the Roman emperors were accustomed to collect such vast bodies of people, the care taken for the due arrangement of the vomitories is the more apparent the more we study the structure of the building. Looking like shadows dotting the lines that divide the *cunei* of the amphitheatres, the numerous apertures of the *vomitoria* are almost as convenient as the rabbit-holes in a warren. In what number of seconds the great area of the Colosseum, which is said to have been capable of containing 100,000 persons (though we ourselves cannot find sitting-room therein for more than 46,000) could be cleared, we have never seen calculated. But there is no doubt that the spectators would enter and depart almost with the speed of a drifting shoal of leaves, and what was even more important than the actual facility of egress, was the knowledge that such facility existed. With the sound and wise arrangements of the Roman architects, panic, so far as difficulty in leaving the building was concerned, was impossible; and it is certain that it is not so much actual inconvenience as panic that is the source of disaster in any case of sudden determination to leave a building.

It is true that accidents from panic of this nature are rare. But, on the other hand, they are of terrible magnitude when they do occur. Two will be fresh within the memory of our readers. One was in a cathedral, the other in a theatre. Fire was the cause of alarm in one instance; mere stupidity, we believe, in the second. In each case the loss of life was serious, and the amount of personal injury sustained very considerable indeed.

It is hardly necessary to point out that those calamities which rarely occur, but which may occur at any moment, are precisely those against which it is the duty of the guardians of public safety to take the utmost care. When to constant liability to unseen danger is added the circumstance that the danger, if it should arise, is of a very fatal description, it is obvious that no further consideration is necessary as to the duty of whoever is responsible for the plan of a public building, viewed with reference to the proportion between the internal area of the building itself and the area occupied by the ways of egress and access.

In speaking of the ways of egress, it will not do to confine the attention to the mere width of the doorway. This, it is true, is a limiting feature of the case, but it is not the only limiting feature. The doorways of many of our new churches are at the top of a flight of steps. Such a position has the effect of reducing the accommodation which would be offered by a doorway of equal width on a level pathway. Hesitation is felt, even by the most active and self-controlled person, on descending a flight of steps. And when those steps are hidden from the eye, which is always the case when one descends steps in a crowd, or even in an orderly procession, the hesitation is increased. If there is any pressure in the rear, or any call for haste, such influence at once increases the timidity of those who are descending, and thus tends to check the outflow of the whole body of people. We only point to these elements, as to the importance of which we think there can be no dispute, as matters which have not yet been reduced to their true arithmetical value. It is highly important that architects should arrive at positive formulæ as to the number of people that may be expected to pass a gate of a given width in a given period of time, and as to the increase of time that would be needed if the gateway were at the head of one, three, or more numerous stairs.

Another point of hardly less importance is the direction of the streams of traffic, or directions in which the spectators have to move, on leaving a building before they arrive at the outer door. The importance of this feature of a building can hardly be exaggerated. The worst form of interior arrangement is probably that of an unbroken open space. Where there are no passages, aisles, or means of directing the outgoing people, but all are able to press at once towards a door, somewhat as water rushes towards the orifice in a vessel, the worst crowding, and the greatest danger and inconvenience, occur. Next bad to this is the interference of two streams of people meeting at right angles. This is a very frequent evil in many new churches. It occurs in two ways. Either one passage comes into another at right angles, as when there is a main line of exit to the north doors of a church, into which pathways lead from the nave and aisles, or there may be a vestibule within the church-door, with doors at right angles to one another. For warmth, freedom from draught, and exclusion of external noise, the use of a vestibule of this kind is well adapted. But its mischievous action as a throttle valve, in any case of panic, unless the ways of egress be abundantly numerous, is such that its introduction should be regarded with the utmost jealousy.

There is no doubt that the care which our old ecclesiastical builders exercised in this respect has been but too much laid aside by their successors. We could enumerate, on the spur of the moment, many churches in which one or more of the ancient doorways have been positively walled up. This has been done, no doubt, during the reign of whitewash. It has been thought that the church would be made warmer, and that it was cheaper to run up a few yards of wall, and smooth it over with plaster, than to put a new door, and hang over it a decent curtain. Moreover, these things were done, for the most part, when the attendance in the parish churches was at its lowest ebb, when the services were most rare, cold, and unattractive, and when the idea of a crowd in a church would have seemed almost as improbable as that of a snow-storm in July.

In this respect our eyes have witnessed a great change, speaking only from the builder's point of view. Considering that it is the object of a public building to accommodate a number of persons sufficient to fill it, and that it performs its function the more thoroughly the more often it is filled, this change is a highly desirable one. Anyhow it exists. The question then deserves consideration, in many a quiet parish, and many a time-honoured and picturesque country church, how far it is safe to leave the mischievous walling up of the doors, which took place some years ago, unrestored and unrepaired.

The question is more serious when it regards new churches. We do not hesitate to admit that it is in this form that it has pressed most fully upon us. We had occasion to observe recently the plans of a very fine church, which is near completion in an important town in a home county, in which the egress afforded is so limited that in the case of any alarm arising during a service the consequence would be very serious. We earnestly entreat any architect whom it may concern,—and we do not speak of one case alone,—to reconsider his plans in such a case, and to protect his own reputation from the chance of any such disaster as would arise from a sudden alarm. A church without a western door is a building wanting in one of the most characteristic features proper to its structure. If, instead of the three normal entrances, at the north, south, and west, we have only two doorways at the west end of the north and south walls; if one of these be so narrow that only two, and the other that only three persons can pass out abreast without jostling, and if the wider of the two be approached from within by a vestibule with two doorways at right angles to each other, it really looks as if disaster were courted. We will suppose the church to be intended to seat some 850 people, besides schools and choir, and that there are only two little postern doors, not readily accessible from the church.

Now we very much question whether, in case of a rush towards a door of the kind we have supposed, approached by a vestibule, any person would get over the space from within the inner to without the outer door in a less period of time than twenty seconds. This would not allow more than ten persons per minute to leave the church by this entrance. If we allow the same rate of egress for the narrower door, without a vestibule, we shall still find that it would take fifty minutes to get 1,000 people out of the church. This may be an over-estimate. On the other hand, if we take observations made as to the rapidity of emptying neighbouring churches when it rains, and suppose that the delay caused by struggle and alarm is equal to that allowed for putting up umbrellas, we are under the mark. In any case, we entreat all those to whom any such case as we have put may be at all applicable,—bishops, incumbents, churchwardens, and architects,—to ponder a word of friendly warning, and to take care that the egress from any new church is demonstrated to be ample, before they share in the very great responsibility of endeavouring to attract a large congregation within its walls.

THE HOARWITHY BRIDGE OVER THE RIVER WYE.*

THE site of this bridge on the River Wye is between Hereford and Ross, about six miles by road from the latter place, and nine miles from Hereford. By river it is eleven miles from Ross and sixteen miles from Hereford. The only other public-road bridge over the river in this distance is at Fownhope, about eight miles above Hoarwithy; hence it will be seen that this part of the River Wye is very scantily supplied with bridges. Before the old timber bridge was built there existed a ferry at this point. The old bridge was built on the site of the ferry, presumably on account of the existence of the approaches, for better sites were obtainable within a quarter of a mile below the ferry. At the point where the bridge is erected the river is as wide, if not wider, than at any other part of it for many miles, either up or down; and on the western side it is deeper than usual, and very shallow on the eastern side, so that the river-bed under the east span is quite dry in summer. Formerly, before the advent of railways, the Wye from Hereford to the tideway was navigable, rafts of timber and barges containing goods being floated down with the rapid stream to Ross, Monmouth, Chepstow, &c. This traffic is now entirely superseded by the railway running from Hereford to Gloucester; but it explains the reason for the great height of the old bridge above the water, even at flood-level, the roadway being 30 ft. above ordinary level. In the Act of Parliament obtained for the construction of this bridge in 1855, this height was stipulated for to avoid injury to the craft passing under the bridge in time of floods. The bridge was built on stone piers and abutments of good ashlar masonry. These have stood very well, and are now in as good a condition as when first built, no settlement whatever having taken place. The superstructure was of Spanish chesnut timber, which seems to have been much used in former times. The work, however, was not well looked after, and it is said that a good deal of green unseasoned wood was used, with the result that after a lapse of nineteen years the greater part of the timber was found to be in an advanced state of decay, although there were many pieces as sound as when sawn. The small scantlings decayed first, the lattice handrailing and spandrel filling, the struts between the ribs, &c.; and these generally at the ends, or where two bars crossed each other in contact; in fact, the decay was most marked at all points where the wet lodged. Hence in all structures, whether of timber or iron, the minimum number of pieces consistent with practicability should be used. This was especially pointed out in a paper read before the Society a year or two back by Mr. Meakin, on the preservation of iron, in which was noticed the wasting that had taken place in the metal of the Charing-cross Bridge, owing principally to the great number of pieces of which the girders were composed, and the difficulty,—and in some cases the impossibility,—of getting at certain surfaces with a paint-brush. The old bridge consisted of three arches of 80 ft. span and 10 ft. rise. Each arch was composed of four curved laminated ribs, 4 ft. 6 in. from centre to centre. The two outer ribs were 12 in. by 10 in., and the two inner ones 12 in. by 14 in. section, each composed of four laminations or thicknesses of 3 in. Two horizontal beams, 12 in. by 14 in., were fixed along the crown of these arches, bolted through the curved rib one on each side of it. The vertical ends of each rib at the piers and abutments were 12 in. by 6 in., and the sprandrel lattice-bars 4 in. by 4 in. Between each two ribs were pairs of struts, 6 in. by 4 in., at intervals of about 6 ft.; and 1¼ in. wrought-iron tie-bolts were placed between each pair of struts, terminating on the face of each exterior rib with a circular cast-iron washer 6 in. diameter. On the horizontal timber beams was spiked 3 in. planking, on which the road-metalling was laid; and this was constantly renewed, as nobody ever thought of lightening the load by its removal, for when the ribs sank and a hollow occurred this was immediately filled up with fresh macadam, till finally there was about 18 in. thick of metalling on the bridge,—about three times as much as was needed. The bridge began to show signs of settlement,—the curved ribs becoming unsymmetrical and the roadway slightly undulating, within a very few years after its completion, and this increased until it was deemed necessary to shore up the arches with vertical timbers, resting on sill-pieces in the bed of the river. This was done to the two side arches, the centre one keeping its true curve till within a year or two of the new bridge being commenced. The settlement took place generally at a scarfing, or where a tie-bolt passed through a rib, as might be expected. The roadway was so uneven that it made one quite uncomfortable to pass along it, and the transit of a vehicle caused the whole structure to vibrate most unpleasantly. The cost of the timber bridge, stone piers and abutments, and toll-houses and approaches, was 4,000*l*. The utmost amount of capital the Hoarwithy Bridge Act enabled the company to raise being 6,000*l*., there only remained 2,000*l*. for the new superstructure, and the question was how it was to be done. About two years ago the Hoarwithy Bridge Company advertised for competitive designs for a new bridge or new superstructure. It was stated that whatever stone might be required was to be had for the quarrying, free of charge, from a quarry about half a mile above the bridge, close to the river bank. This fact induced Mr. Whitaker to send in two alternative designs, in stone and wrought iron. Not being sure of the capabilities of the abutments to withstand the thrust of an arch of a span of 80 ft., even if the springings had been lowered considerably and the arcs increased, he determined upon building three new piers similar to those existing, and dividing the three 80 ft. spans into six of 37 ft. each. These he proposed to make semicircular, springing them 8 ft. lower than the timber arches, and thus reducing the lateral thrust at the abutments to a minimum. The design for a stone bridge, however, had to be abandoned, owing to the lowest tender sent in amounting to 2,800*l*., or 800*l*. in excess of the funds available. Mr. Whitaker estimated the cost at 2,000*l*. only, and is convinced that had the work been offered to a contractor accustomed to engineering work, and not to church, school, and house builders, it could have been done for the money. The other design was for a lattice-girder bridge in three separate spans (not continuous). The cost of this was estimated at 2,500*l*. Mr. Whitaker then set about endeavouring to cheapen this bridge, which he was enabled to effect to a great extent by the adoption of Messrs. Westwood & Baillie's patent corrugated flooring, without the ordinary cross girders. Still, however, the estimated cost was in excess of the 2,000*l*. available, and the price of iron keeping high, the company had almost become resigned to letting the bridge fall down and winding up their affairs. About this time a friend suggested to Mr. Whitaker the possibility of reducing the cost of construction by having a continuous girder over the three spans instead of a separate girder for each span. It was found that continuous girders were much more economical, effecting a saving of 12½ tons of metal in the structure. Mr. Whitaker at first thought of placing the roadway on the bottom flange, thereby saving the cost of a hand-rail; but afterwards, considering the lightness of construction, width of road, &c., he determined on placing the road on the top, and the girders nearer together than if the roadway had been on the bottom flange, which would of necessity have been the full width of the roadway, viz., 15 ft. The main girders are 255 ft. 5 in. in length, 5 ft. 6 in. in depth, with flanges 1 ft. 3 in. wide, and from ¼ in. to ⅜ in. thick. Vertical web-plates ⅜ in. thick, 9 in. deep, are attached to the flange plates by 3½ in. by 3½ in. by ⅜ in. L-iron throughout. The roadway overhangs the main girders 1 ft. 6 in. on each side. The main girders are braced together by diagonal L-iron bracing 3 in. by 3 in. by ⅜ in. at intervals of about 20 ft. The roadway is formed of Westwood's patent corrugated flooring plates ⅜ in. thick, and 1 ft. from centre to centre of corrugations. These corrugated plates form a great element of stiffness in the structure, the whole becoming something like a box in cross section. The corrugated plates are trussed every 4 ft. by a flat bar riveted to the under side of the bottom flanges of the main girders, and bent down under a vertical strut, consisting of a small girder, 1 ft. 3 in. deep, running the entire length of the bridge along its centre. The corrugations are filled in with asphalte, composed of gravel, ashes, tar, &c., forming the roadway. The hand-rail consists of a fir base and cap, with L-iron vertical standards and T-iron top and bottom next the woodwork. The filling-in is of wrought-iron lattice bars, 1½ in. by $\frac{5}{16}$ in., the whole being fastened to the corrugated plates, and a raking L-iron from the end of this to the vertical L-iron standard as a strut. By this means a rather good form of railing was obtained, 4 ft. high, and costing about 10*s*. per foot run. The main girders being continuous, the strains are partly in tension and partly in compression. The point of contrary flexure in the side spans is taken at 17 ft. 8 in. from centre of pier, and in the centre span at 25 ft. from centre of pier. The rolling load was taken at 1 cwt. per superficial foot, or 15 cwt. per foot run of bridge, and the weight of one span at 40 tons, giving a total distributed load of 100 tons on two girders in one span, or 50 tons on one girder. The contract for the ironwork was let to Messrs. Westwood & Baillie in May, 1875, for the sum of 1,492*l*. The main girders and trussing, and, in fact, nearly the entire superstructure, were built up and put together on the old bridge as a staging, the metalling being first taken off to lighten the structure. The flexibility of the old bridge was such that it was found extremely difficult to build up the main girders symmetrically, for directly a few hundredweights of metal were put together on one end, the portion of flooring immediately below would sink, and the other side of the span would rise simultaneously. It was therefore only by constant care and continual levelling and packing that the proper straight line of the flanges could be kept. The main girders and diagonal bracing, &c., were completed about a fortnight before Christmas last, and the weight being transmitted to the piers by timber packing, the timbers of the old bridge were cut away underneath, and allowed to fall into the river, when they were secured and towed ashore by boats. The two longitudinal girders were completed, and the transverse diagonal bracing and trussing finished, before the lowering commenced. The corrugated plates over the centre span were also fixed (bolted, but not riveted), in order to make the structure more compact and rigid. The plates and corrugations over the end spans were not laid on, for they would only have added to the weight, and sufficient rigidity was obtained by the centre plates being fixed. Four hydraulic rams were fixed to timbers below the underside of the girders,—two rams to each pier, one underneath each girder. There were no rams at the abutments, the weight of the girders, overhanging 80 ft. at each end, being supported by long timber levers, 1 ft. by 6 in., resting on a fulcrum at the face of abutments, consisting of baulks of timber as packing. The pumps were placed in the centre of the bridge, ½ in. wrought-iron tubes communicating with the rams, which were 8 in. in diameter. The pistons of the rams were pushed out about 5 in., when they took the weight, and a piece of the packing being removed the structure was lowered a few inches. This operation was repeated until the structure was lowered the whole distance of 10 ft. 6 in., and rested on the bed plates fixed to the masonry of the piers. The work of lowering might have been done in two days, but it really occupied six weeks, owing firstly to the leakage of a ram; secondly, to the freezing of the water in the pumps; and thirdly, to the prevalence of high winds, during the continuance of which it was not thought advisable to proceed with the lowering. The structure was, however, lowered

* From a Paper read at a recent meeting of the Civil and Mechanical Engineers' Society, by Mr. C. W. Whitaker, C.E.

to within about 1 ft. of its ultimate position (practically the whole distance) in about a fortnight. Then the weight was supported from the middle of the piers so that the masonry under the girders could be got at and rebuilt for about 3 ft. 6 in. in height, each course corbelling over from 6 ft. wide at bottom to 8 ft. at top, so as to give the necessary length of bearing for the girders. The girders are fixed to the western pier by 1 in. lewis bolts, and rest on friction rollers 1 in. in diameter at the east pier and two abutments, ⅞ in. steel bearing-plates, with countersunk rivet-heads, being fixed under the bottom plate of girders over the friction-rollers. A space of 2½ in. at the east end, and 1½ in. at the west end, is left for expansion. The height of the old bridge above the river caused the approaches to be much steeper than those to the new bridge. The roadway of the latter is 2 ft. 7½ in. lower than the old bridge, and this has enabled the approaches to be made with gradients of about 1 in 50, instead of 1 in 30, as was formerly the case. In conclusion, Mr. Whitaker testified to the satisfactory manner in which the work had been carried out by Messrs. Westwood & Baillie, the contractors for the ironwork, their representative on the works being Mr. Hunter, while Mr. Leigh, a pupil of Mr. Whitaker, had acted as clerk of works.

In the discussion which ensued, the speakers were unanimous in expressing the opinion that the bridge, considering its size, was a marvel of constructive economy.

QUESTIONS AFFECTING THE IRON TRADE.

At the recent meeting of the British Iron Trade Association, Mr. G. T. Clark, president, delivered an inaugural address, in the course of which he said,—There is a close and an increasing connexion between the iron trade and the railways of the country, not only as regards the manufacture of the rails, but as regards the conveyance upon them of ore, fuel, and iron. To the introduction of railways is due the great development of the iron trade, and it is the continued demand for railway iron that has raised and maintained this trade as one of the great industries of the world. Where other customers have taken from us scores and hundreds of tons, railways have taken tens of thousands, and to them it is mainly due that, in the thirty years following their introduction, our make of malleable iron quintupled. Nor is it only as customers that railways have benefited our trade. By the facilities they afford we are enabled to draw our ironmaking materials from sources that would otherwise have been closed. Forty or even thirty years ago, the convenient conjunction of iron ore, coal, and limestone, was the cause of the prosperity of some of the most important seats of manufacture. This is no longer the case to anything like the same extent. By the rail we can transport the coke of Durham at a cheap rate to the Cleveland iron stone, and the same admirable fuel across England to the rich hematites of Barrow. It is not too much to say that, but for the facilities of transit afforded by railways, the progress of Middlesbrough must have been slow, and Barrow could scarcely have existed at all as a great centre of the manufacture of iron and steel.

But, much as we owe to railways and the railway system, and good customers as we and our brothers of the coal trade are to them, our interests are by no means identical at all points, though our alliance need not be the less cordial that it requires careful and constant watching. Railway managers are a very able and a very quick-witted class of men, and though generally aware, and ready to admit in the abstract, that the safest profits are those derived from low rates and great facilities for transport, they sometimes are found to sacrifice these broad and well-formed views for present gain. It is true that the ultimate object of a railway manager is the giving a good dividend to his shareholders, and not the development of the resources of a district, but what we have to keep steadily and powerfully before these gentlemen is the fact that these two points are in the main inseparable, and that, not only where the resources of a district are large, but even where they are but moderate, it is sound policy, even at a present loss, or with a very moderate margin of profit, to induce their development. Sam Slick's plan with his clocks was a very good one. Lend your clocks freely, and after a short time people find they cannot do without them and will purchase. Once let a railway be at work and the interests which it generates become too strong to be allowed to drop. Many of us know cases in which a single railway has held the monopoly of a district and checked its progress, as proved by the vast increase of trade which has followed upon the opening of rival lines.

This subject of facilities of transit is one to which the attention of our association should be directed, and the just and wise regulation of which we should promote with such influence as we may possess. As the margin of our profit becomes less, so much the more important does it become that we should have cheap and convenient facilities for the transit of our raw material and our finished or half-finished produce; nor are there any two points in England so distant that a profitable trade might not be made to spring up between them by a liberal railway policy, or, what is even more important, the trade between which might not be diverted or even destroyed by one of a short-sighted character. When I state that in stirring times the pig-iron of Middlesbrough is actually brought by rail to South Wales, I adduce a very strong argument in favour of cheap transit, and show how extreme a case is made possible under a liberal railway policy. To obtain and maintain the exercise of such a policy, no exertions on our part should be wanting.

We have proposed, and, I think, wisely, to exclude from the scope of our association "questions affecting the regulation of wages or those of a local character." These are best left to the consideration of the associations now to be found in every manufacturing district. For their equitable adjustment they require a close knowledge of circumstances, and are, besides, accompanied too often by irritations and heart-burnings and mutual animosities, which it is very undesirable to import into our discussions. But it by no means follows that the philosophy of wages and the distribution of returns between labour and capital are not to be considered here, as well as those questions of interference with natural laws and individual freedom of action which are connected with fluctuations in the price of labour, and with the general relations between the employer and the employed; for such questions lie at the root of our own and every other trade. Upon their solution rests the prosperity, not only of our trade or of our country, but of the whole world; and the statistics of production, commercial treaties and tariffs, and home legislation, important as such subjects are, sink almost into insignificance before that one great question of the wages of labour.

Labour and capital, which is the accumulation of labour, are co-equal powers. Without labour capital yields no return, and will be dissipated; without capital labour cannot be employed to advantage, and the labourer cannot rise to independence. Unfortunately this truth, which is as fixed and indestructible as any other of the laws by which the world is governed, has not yet forced its way into the understandings of the masses in this or any other country. If it be too much to say that labour in England, as in the centres of manufacture in France, has declared war against capital, it is at least true that it places itself in opposition to capital, and the employer who but recently was regarded as a useful citizen, is now, to some extent, thought to be one who desires to reap where he has not sown, or at the best claims more of the joint produce than he ought to do. The causes of this change are deep-seated. During the last half-century, since the end of the wars of the first Napoleon, there has arisen all over Europe and in the United States a great development of the industrial arts, fostered by the general use of steam-power, by vast improvements in machinery, by the tendency of such machinery to create large establishments and augment already overgrown towns, by the construction of railways and steamboats, by immense facilities in postal communications, by the removal of the tax on newspapers, and, finally, by the invention of the electric telegraph. The effect of all this has been a rise in the wages of labour not nominal only, such as might be produced by the greater plenty of the precious metals, but real, great, and rapid beyond anything before experienced, and raising, in every article into the production of which labour at all largely enters, the cost of production in a far higher proportion than that of the necessaries of life, though most of these have also risen, and considerably. During that long period from the commencement of the reign of Louis XIV. to the battle of Waterloo, while other nations were distracted from the arts of peace by war or the apprehension of war, England, from her insular position, was at rest, and became gradually a hive of successful industry. During the latter part of that time she was supreme in the markets of the world for manufactured goods. The English capitalist took the lead in boldness of adventure; the English artisan in skill and perseverance. "*Indocilis pauperiem pati*," the device of the merchant venturers of one of our great seaports, was the sentiment of the whole nation. In the employment of her coal, the construction of her machinery, the outlay of her capital, the industry of her artisans, and the force and energy of her marine, England had no co-rival. "Wherever," said Napoleon, with the bitterness of deadly hate and envy, "wherever a cockboat can float, there I find the British flag," and beneath that flag were poured forth the cotton and the cutlery of Britain.

But the fall of Napoleon, and the repose that followed, enabled other nations to come forward in the race, and whatever may have been the continued progress of England, and it was great, France, Belgium, Germany, and the United States gained greatly upon her, though even as lately as the introduction of railways on the Continent, Mr. Brassey could testify that, although English wages were higher than in any other country, railway works could be executed more cheaply by English than by any other labour.

There arose in England a belief, and a not ill-founded belief, on the part of the artisan, that he obtained too small a share of the returns to which, by his industry, he had largely contributed, and for this larger share, as for all good things in this world, he had to contend. At first, in the ignorance in which the working classes had culpably been suffered to remain, they had recourse to riots and open violence, but by degrees, better instructed, they formed the combinations known as trade-unions, organised at first as provident or benefit societies for the sick or aged, afterwards extended to take in hand the regulation of wages and particulars of labour, and, from time to time, with perhaps equal excuse, but with less wisdom, employed also in political questions.

Our immediate and direct business as British manufacturers is with British unions; but, as these combinations exist in extreme forms elsewhere, our Association will have also to pay attention to the fruits which they produce in other countries.

Now combinations on the part of the artisan classes and in their interest are natural and right, and, since the alteration of the law in 1824, are legal. Although capital and labour are so intimately connected that one cannot be deeply injured without injury to the other, they have also points of variance, and it is only by a conflict of forces that a resultant course, representing each, can be arrived at. What has to be secured in these struggles, in the interests of the whole community, is that neither party interfere with that entire freedom to employ himself at pleasure in any lawful trade, which is the ancient right of every man under the common law of England, and which, though from time hampered by statute, was never lost, and is now once more fully recognised by the Legislature.

Trade-unions being thus in themselves lawful and right, and the recognised organs of labour, it becomes essential that their course of action should be understood, and this must be gathered not so much from their professions, though these are not indistinct, as from their practice. Their first and main, and very legitimate object, is to increase the wages of labour, and to bring this about by the means, equally legitimate, of combination. But having, by the setting forth so desirable an object, by means so legitimate, obtained the confidence of the artisan classes, they proceed to steps of a different character. To raise wages they adopt means which diminish production, and this by restricting the number of artisans admitted as apprentices into a trade, by shortening the hours of work, by discouraging piece-work, and, where possible, the employment of machinery, and it is difficult to say which of these devices is the more opposed to sound principles or to the general interests of the whole commonwealth.

What rent is to land and wages are to labour, profits are to capital, and as they form the residue of the fund of returns out of which, where a trade is successful, wages must ultimately be paid, anything that diminishes that fund has, so far, a tendency to lower wages; and, therefore, whatever means are adopted to obtain for the labourer a larger proportion out

of the fund, great care should be taken that they are not such as to diminish its total amount. But profits depend for their rate upon the cost, not upon the wages, of labour; and the cost of labour is determined by the proportion between the wages of the labourer and the value of his production: consequently, measures that have a direct tendency to diminish the quantity of an article produced and to raise its cost, will, so far, depress the trade in favour of rivals who are allowed more freedom of action, and so will work injury to all. To restrict by artificial means the number who may follow any particular trade is only to throw upon the mass a number of persons who might be better employed, and who, by adding to the general supply, have a direct tendency to lower the average of wages.

Profit, or that which remains to the employer when his capital is replaced and the wages of labour have been paid, is the joint produce of capital, skill, and industry, but it is an error to represent it, as is now often done, as the fruit of industry alone, and therefore the property of the workman; nor is the step from this a great one to that of representing the interest of the employer as altogether opposed to those of the employed, and seeking to compel him to raise wages with but little regard to the source whence alone they can be derived.

As to the hours of labour, it may be admitted that in some trades they have been too long for the average workman, and so far as they tend to depress him physically and intellectually were therefore injurious to the community. Relief on this head was no doubt needed, but to forbid any man, whatever may be his strength or skill, to employ those qualities for his special benefit, was scarcely the way to bring it about. The tendency of such an order is to place the weak and strong, the skilful and the unskilful, the idle and industrious, on the same dead level. It is true that in practice the unions do not carry their opposition to piece-work to the length of absolutely prohibiting it, but the arguments employed by them, if followed to their legitimate consequences, would be prohibitory.

The manner in which these restrictions have been enforced is equally objectionable with the restrictions themselves, and includes all methods of coercion, from social exclusion up to serious bodily injury and even death. All individual liberty is forbidden. The conditions of labour are dictated by a committee of delegates whose deliberations are, not unfrequently, kept secret, and whose authority is paramount.

It may be said, probably with truth, that the regulations of the Manchester and Sheffield unions, conceived in ignorance and enforced by crime, are confined to unions composed of the lowest and most ignorant class of workmen, and are disapproved of by all others. Still, admitting this to the full, the violation of sound economy and the interference with individual liberty are rather in degree than in principle.

Of course it often happens that a union is not strong enough to carry out its wishes to their full extent, but their tendency is such as I describe. Even if the restrictions were in themselves in some respects beneficial, they are not the less an interference with that individual freedom for which we in England have struggled so long; and their direct effect is to lower the standard of excellence attained by British industry, to deteriorate quality, to check quantity, and to enhance cost, and to do this by forbidding individual freedom of action, and diverting the natural course of labour into artificial channels. It is scarcely for a Government, still less for an irresponsible and private body, to judge what trades are overcrowded. That this and similar points are best left to be settled by natural laws is a truth which we, in this country, have been slow to learn, but which we have learned, and will, I trust, yet maintain.

Moreover, this system of interference with natural law, supported by petty annoyances, rising to social terrorism, is even now producing its effects in England by the stimulus it affords to the productions of other countries. Belgium already runs England very close in all her great industries. Wages in that country are far lower than here, and the cost of living is about the same. Her artisans are skilful and industrious, and her progress has been effected during a period when her very existence, as an independent nation, was threatened.

There is the less excuse for this suicidal policy, that not only in Belgium but in France and Germany, wages are lower, and the position of the artisan less advantageous than with us. Here there exist few or none of those old legal restrictions on trade that linger in parts of the Continent, and especially in Germany, and which are described as having been, in the United States, at the close of the late war, far more vexatious than those prevailing in England in the days of Mr. Pitt, and the contemplation of which drove Mr. Wells to become a freetrader. In England, food, clothing, and lodging, are as cheap, or cheaper, than on the Continent, and the industrious, prudent, and skilled workman, can at this time do better for himself here than even in the United States. The consular returns to the Foreign Office, first called for by Lord Clarendon in 1869,—returns which might be consulted with advantage by our working classes,—show that in no country, excepting perhaps Holland and Switzerland, is an artisan better off than in England; and in Switzerland the difference seems to be due only to their greater frugality and the absence of intemperance.

In these disputes about labour, as in not a few of our national troubles, the cause is mainly ignorance. The English artisan is not usually by any means a vicious man. Even where he joins in attacking employers as a class, he not unfrequently bears no sort of malice against his own employer. He does not seek to regenerate his country by bringing every capitalist to the scaffold, or even to the poorhouse, or by destroying public monuments or other evidences of national greatness or accumulated wealth. Where the individual master, and, in some considerable degree, where the masters of a special district are allowed to deal directly with his or their own men, the men are usually willing to listen patiently to reason. Nevertheless, it is vain to disguise or deny the fact that British workmen, by their representatives, the trade-unions, are at this time acting in opposition to the doctrines of free trade and of freedom of action.

The drift of the Western world, ever since the invention of printing, has been all in one direction, and every movement has contributed to improve the condition of the masses. Privilege after privilege, restriction after restriction, has crumbled away. The discovery of America, the doubling of the Cape of Good Hope, the use of gunpowder, the reformation in religion, the colonisation of the fifth division of the globe, every discovery, every invention, has been a step in the same direction, tending powerfully to equalise social conditions, to break down divisions, to bring about, not that equality of individuals which is the empty but dangerous dream of the socialist, but the removal of artificial restrictions, and to allow each man freedom to employ his powers in that way which seems to him the best, and which has been found to be on the whole the best for the community.

But a few years ago, the policy of protection was almost an integral part of our industrial system, in manufactures, commerce, and agriculture. And yet in England, a country very distrustful of change, as change, the voice of reason has been heard, and great and powerful interests, such as those involved in the navigation laws, and the growth of corn, have given way. It has only been after severe struggles, and at great cost to specific interests, that perfect freedom of manufacture and of trade, and individual freedom of action, have been won and established; and we are now asked in the interests of labour to reverse this decision, and to return to a system of restrictions and interferences which is at direct variance with all our convictions.

I have touched at some length upon these burning topics, I hope in no spirit of cavil or exaggeration. I have described the operation of trade-unions, as they are now, or have recently been, carried on, and especially as they affect the iron, and its subsidiary, the coal trade; and this I have done because, although it is highly undesirable that this Association should become an arena of controversy, it cannot but be that we shall have to give our attention, and our most serious and anxious attention too, to one of the most complex and most pressing problems of modern times, and one upon the solution of which depends the prosperity of our own trade, and, in a great measure, that of our own country.

Our Association enters upon its existence in a time of general depression, and one in which we have to grapple with new and somewhat formidable dangers. But the qualities which have gained will maintain success, and they know but little of England who suppose that the energy and boldness of our capitalists, or the skill and industry of our working classes, have seriously fallen off, or that our internal disputes will not be conducted, on the whole, with that practical sense and moderation to which we, as a nation, lay claim. Even now, dark as is the hour, and deep the winter of our discontent, there are not wanting symptoms of a revival, nor, perhaps, is it too much to express a hope that we may soon be able to hail with the poet, as a sign of the returning spring, that

"Vulcanus ardens urit officinas,"

and may see

"The silent furnace once again in blast."

THE ARCHITECTURE OF SOUTH HOLLAND.*

SOME years ago I had the pleasure of spending several weeks in a ramble amongst the beautiful churches of Norfolk and Suffolk, and as I approached the coast, and looked upon the North Sea, I often found myself wondering, as one does wonder when one looks at the sea, what the land on the other side of that ocean was like; and from this I was led to speculate whether its churches would resemble those beautiful structures which I was then engaged in studying. Speculation naturally led to inquiry, and I was assured that there existed the greatest similarity between the churches of Holland and those of Norfolk and Suffolk; not only so, but I was told over and over again that the beautiful roofs which form such marked features in the Norfolk and Suffolk churches were absolutely framed and carved in Holland and sent over here. Now, as the form of roof adopted in Norfolk and Suffolk influences the entire plan of the churches in those counties, leading to the adoption of light and elegant clearstories, with little or no wall space, and lofty and slight arch piers, I pictured to myself a Dutch church as being a kind of enlarged edition of St. Peter's Mancroft, Norwich, or St. Nicholas's, Lynn, and there was certainly much in the history of Holland to favour this hypothesis. The requirements of the two people, as far as church matters went, were very similar,—that is to say, both required large important parish churches, capable of holding vast congregations, and not abbeys or cathedrals. The difficulties were much the same on both shores of the North Sea,—the absence of good building stone, and a soft, spongy soil, incapable of sustaining great weight, and bad for foundations. With these speculations working in my mind I visited Holland, and it is hardly necessary to say the very first Dutch church I saw caused my air-built edifice to vanish like smoke. Instead of a rich exterior, with elaborate parapets, panelled buttresses, and light and elegant clearstory, I had before me a huge building of red brick, without either parapets, strings, or labels, and great bare walls, pierced with immense windows, filled with very wiry curvilinear tracery. The interior was, if anything, still more unlike what I had pictured to myself; there were no capitals or bases, the piers were composed of curious rude arch-moulds brought down to the ground; there were no strings, panelling, and carving of any kind, and hardly anything deserving the name of a moulding. It is true there was a wooden roof, but how different to the wooden roofs of Norfolk or Suffolk! Instead of the richly-carved hammer-beam, with its graceful angel terminal, the cusped principal, and elaborate wall cornice, here was a huge barrel-vault, devoid of panelling or even ribs, its monotony only broken here and there by ponderous tie-beams. Yet with all this bareness, baldness, and absence of detail, there was something striking and solemn about this vast plain church, and it struck me at once that with rich furniture, pictures, and stained glass, the effect of one of these interiors must have been very impressive. Now the account I have here given would serve as a description of about seven-eighths of the whole of the churches in Holland, and one is at once tempted to ask the question, How is it that two peoples, both having the same wants, suffering under the same difficulties, and so nearly connected by race and geographical position, should have developed two styles so totally dissimilar as those of the East of England and the West of Holland? I think it is not difficult to answer this question. The fact is, the Mediæval builders of Norfolk looked the difficulties they had to encounter boldly in the face, carefully studied them, and created for

* By Mr. H. W. Brewer. Read at the Architectural Association, as elsewhere stated.

themselves a style of church architecture thoroughly applicable to their needs. Thus finding that they could only obtain stone at great expense and with great difficulty, they used it very sparingly, and constructed their walls chiefly of flint. Now a more unpromising material could scarcely be imagined; yet, after a time, how beautifully they came to treat it. If any one doubt this, let him look at the south side of the nave of Wymondham Church, or the south chancel of St. Michael's Coslany, Norwich, and then say whether a truer application of surface ornamentation, or a more artistic treatment of material, is to be found, even in Venice or Sienna. Again, finding vaulting an impossibility, on account of the bad nature of their foundations, the East Anglian architects invented a form of wooden roof so perfect and so ornamental, that when looking at the interiors of such churches as St. Peter's Mancroft, Norwich, North Walsham, or Lavenham, one hardly envies France and Germany their magnificent vaulted roofs. Now the Dutch architects of the Middle Ages worked upon a different principle, and I think this will account for the fact that their architecture is, comparatively speaking, a failure. Their buildings are often monotonous, and devoid of originality; their construction is frequently faulty, and their detail poor and uninteresting,—at any rate, to a great extent. Of course, there are churches in Holland,—such, for instance, as the cathedrals of Maestricht, Utrecht, Bois-le-Duc, and Breda, and the minster church at Roermond,—which avoid all these defects. However, these defects are certainly the *rule* in Dutch churches, and the exceptions are few and rare. What led to these defects is the fact that instead of originating an architecture for themselves, the Dutch Mediæval architects copied the plans of their churches bodily from the French. Thus nearly all churches of any size in Holland possess a chevet, with radiating chapels; the naves generally have double aisles or aisles and chapels; and the smaller churches universally have one or more apses at the east end. The most marked departure which they frequently made from the French plan was in exaggerating the length of the transepts, and using one western tower instead of two. There are, however, exceptions to this rule, for the Catholic church at Arnheim, erected between the years 1328–1340, has two western towers. Curious examples of the exaggeration of the length of the transepts are to be seen in the great Protestant church at Bergen-op-Zoom, where each transept has six bays, while the nave has only four bays in the cathedral at Roermond, and at St. Pancras Church at Leyden. I can offer no suggestion for the cause of this peculiarity. Having copied the plan of his church from France, the Dutchman borrows his detail ready-made from Germany; he never seems to have given sufficient consideration to the difficulties of site or material; thus, although, except in a few instances, driven to use brick, he adopts a plan almost peculiar to stone buildings, and suggesting, if not absolutely requiring, vaulting to give a reason for its form and construction; and although driven by the insecure foundation to construct his roof of timber, this is generally made like a poor imitation of a stone roof. Nothing can, I venture to think, be less pleasing than the effect of many of these Dutch timber roofs, especially when, as at Gouda, the great church at Amsterdam, and Bergen-op-Zoom, &c., they are unbroken by any arches at the crossing, and simply mitre at the intersection of the nave and transepts. I do not think that any one who has seen these roofs can for a moment believe that the Dutch constructed or carved the beautiful roofs over the churches in Norfolk and Suffolk. It is true that there does exist one hammer-beam roof in Holland, and that of a rather early date. It is over the great hall of the palace at the Hague, and is of large span, but very rude, and unadorned by carving or mouldings. It may date from the commencement of the fourteenth century, and looks like a clumsy imitation of English work. All the Dutch timber roofs which I have seen look like makeshifts, and, what is so singular, they never seem to have anything to do with the buildings they cover. The churches are built just as if they were intended for vaulting, and then covered in with one of these ponderous heavy-looking barrel-roofs. I am told that the Government architects in Berlin show no roofs upon the elevations of their designs for public buildings, because they consider that where the roof begins architecture ends. One would almost think that the Dutch Mediæval architects laboured under some similar kind of superstition, when they found themselves prevented from putting up a stone vault over their churches. Another singular thing is that although the Dutch architects were obliged to use brick, and were able to procure this material in great perfection, they rarely attempted any artistic treatment, but confined its use entirely to plain walling. It is true that there are two or three churches; for instance, the Protestant church at Roermond, and the desecrated Carmelite church at Venloo, in which the arches, piers, and vaulting-ribs are all formed of brick, rather roughly cut and covered with a thin coat of plaster. The latter church also has some ornamental patterns stamped upon the brickwork of the gable, and the Roman Catholic cathedral (formerly the Carmelite church) at Utrecht has its western gable adorned with curvilinear tracery executed in brick (1524). With all these defects in design and construction, and poverty of invention in the use of material, the Dutch churches are generally very striking, partly, no doubt, on account of their vast size and height, and also by reason of their pleasing proportions. The Dutch Mediæval architects seem to have succeeded thoroughly well in the towers which they designed for their churches. That of the great Protestant church, formerly the cathedral, at Breda is a noble and beautiful example, dating from about the year 1410; it is 362 ft. high. The great and now isolated tower of the cathedral at Utrecht is another grand example of a Dutch tower; 72 ft. square at the base, it is crowned by a beautiful octagonal lantern, and in its present mutilated condition reaches a height of 321 ft. It was erected between the years 1321 and 1381. The tower of the Protestant church of St. John at Maestricht is very singular in design, but not so grand as to its dimensions. It is, however a noble tower, 230 ft. high. The church of St. Ursula Delft, has a rather squat stone spire, and four pinnacles. The cathedral of Middlesbourg, in the Walcheren, and Bois le Duc, and the churches of Boxtel, Helvetsluis, Flushing, &c., have fine Gothic towers crowned with lofty renaissance spires of timber. The churches of Rotterdam, Dortrecht, and Delft, have grand but unfinished square towers. There is, of course, little furniture to be found in the Dutch churches, but what little does exist is remarkably fine. I will just mention, in passing, the stalls in the Catholic church at Venloo and the Protestant church at Breda, as fine examples of Gothic woodwork; and the stalls at Dortrecht, and the marble high altar in the Catholic church at Venloo, are noble examples of Early Renaissance. The font at Breda is a beautiful example of Early Renaissance metal-work, though, from the church now being Protestant, all the figures which formerly adorned it have been destroyed. Examples of metal-work abound in the Dutch churches of every date, and are universally good,—sometimes remarkably beautiful. There is little stained glass left in Holland except at Gouda, which contains seventy-five windows filled with it, dating from the years 1560 to 1603, so that the latter windows were added after the Reformation, and, with singular inconsistency, the people of Gouda must have been tearing down pictures from the walls, and putting pictures into the windows at the same time!—a brilliant example of consistency which has recently been copied at Exeter Cathedral; but to make this matter the more singular, all the other stained glass in the country was smashed as being idolatrous! However, whatever reason, or want of reason, has saved these windows, all lovers of art must be thankful. I will not enter into any description of them, because the glass at Gouda would deserve a paper to itself, in addition to which I have no drawings of it. I may, however, in passing, say that I was slightly disappointed with it, as it seems to me to have a kind of opacity about it which reminded me of the modern German glass. Of course, the drawing and design of these windows are superb. A Dutch gentleman pointed out to me that the windows, previously to the Reformation, were filled with sacred subjects, chiefly from the Scriptures, whereas those after the Reformation were all allegorical subjects, illustrated by Pagan mythology, and he said (I do not think he quite saw the deduction to be made from his words),—"You see, there is no *Christianity* in these later windows, consequently there is *nothing* to which one can possibly object."

I will now enter into a detailed account of a few of the churches in Holland which, either from their importance or their peculiarities, or from their being unlike the general run of ecclesiastical buildings in that country, merit particular notice, and I shall confine myself entirely to churches south of the river Rhine. Holland possesses remarkably few churches of an earlier date than the fourteenth century, and those which do exist are, as a rule, marked by no very distinguishing peculiarities. They are, in fact, as a rule, exactly similar to the German Romanesque churches of the Lower Rhine. The most interesting examples of early churches to be found in Holland are the circular chapel, called sometimes the temple, and sometimes the baptistery, at Nijmegen (it is rather a rude example of Romanesque work, probably not earlier than the twelfth century); the church of Rolduc, which is a tolerable example of German Romanesque; the cathedral and church of Notre Dame at Maestricht; and the minster church at Roermond in Limberg. The three last-named buildings are so important and so remarkable that they demand a detailed account.* The minster church in Roermond is another most interesting building. It consists of a nave of four bays, vaulted in two; western transepts, with a kind of fore-nave to the west of one bay; a deep western porch; eastern apsidal transepts; and a very short chancel, consisting of only one bay and a semi-circular apse. There are towers flanking the choir, and also the fore-nave, and over the crossing is an octagonal lantern, crowned by a dome. The exterior of this beautiful church had been sadly mutilated during the last two centuries. Of the four towers three had been pulled down to the level of the roof, and a heavy and clumsy tower of brick had been erected over the western porch. The weight of this tower had rendered the western portion of the church so unsafe that it was found necessary to pull it down, and entirely reconstruct the western porch. This has been very skilfully done under the superintendence of Mr. Cuypers. The two eastern towers have also been carried up to their original height, and crowned with slate spires, and the two western towers are at present in course of construction. Great fault has been found with Mr. Cuypers, by some of the local archæological geniuses, because he has carefully restored the domical roof of the centre lantern just as he found it, instead of capping the lantern with a pyramidal roof. Mr. Cuypers's defence will, I think, commend itself to all sensible people. The dome, says Mr. Cuypers, dated from the fifteenth century, and is probably a unique example of such a feature erected in Northern Europe at this date—so uncommon, in fact, that it is very probable that the fifteenth century restorers simply copied what they found already in existence. This dome is of timber, covered with lead, and it is constructed in what is called ridge and furrow,—that is to say, it is a star in plan, and not an octagon. The nave, transepts, and choir of this church are rich German Romanesque work, but the western transepts are most beautiful First Pointed work, far more French than German in general treatment. They are the only examples of this style I have met with in Holland, a thing greatly to be regretted, for there is a noble simplicity, together with an effect of richness, about this portion of the minster at Roermond that I have rarely seen surpassed anywhere. The nave and western transepts have very large and grand triforia, which are not carried round the eastern transepts, but terminate in small apses which are bracketed out from the western walls of the transept, and from the interior of the transepts appear like oriel windows. Each of these singular little structures contains its original altar. Two ancient altars also exist in the triforium space, under the eastern towers; but what is most remarkable is the fact that the original high altar still exists *in situ*, not, as one would suppose, in the great apse of the choir, but in a semicircular recess on its eastern extremity. Mr. Cuypers told me that he had, over and over again, examined the altar, and he could not find the least mark of its having been removed at any time. There can also be no doubt that it was originally the high altar, because it is of very large dimensions. Mr. Cuypers has determined, when he comes to restore this portion of the church, to remove the modern high altar, and restore this one to its ancient use. Under the crossing is a fine thirteenth-century altar-tomb,

* The Cathedral and Church of St. Servais, at Maestricht, were described, and the porch of the church illustrated, in the volume of the *Builder* for 1871, pp. 344 and 347. Illustrations of many of the other buildings mentioned in this paper will also be found in the *Builder*.

with recumbent figures of a later date, probably fifteenth-century, commemorating Girardus III. of Nassau, and his wife. In the south transept is an altar, with a most superb carved tryptich reredos of the fifteenth century. It is filled with scenes from Our Lord's Passion, represented by hundreds of small figures, most delicately carved and finished, and the wings are painted in oil by a master of the Early Flemish school. The whole is richly painted and gilt, and is a most splendid example of ancient church furniture. This church possesses also a splendid monstrance of silver, 3 ft. 3 in. high, and adorned with the most delicate tracery and tabernacle work.

Roermond contains two other churches, both of which I have already mentioned. The Cathedral, dedicated to St. Christopher, is a large fifteenth-century church, possessing, I think, many of the defects that are to be found in a Dutch church, together with most of the peculiarities. It has immensely long transepts, which terminate in apses; but attached to the apse of the southern transept is a small porch, the roof of which is a regular piece of English vaulting, with rich bosses and lien ribs. This church was erected into a bishop's see by Cardinal Granville in 1560, but the see was shortly afterwards suppressed. In 1850 it was again restored, and forms the cathedral church of the Roman Catholic bishop of Roermond. The Protestant church in Roermond is remarkable for its piers, arches, and vaulting-ribs all being constructed of brick. The nave and aisles are of one height, under one external roof. The piers are square, the arch-moulds being bracketed out from each face at the springing of the arches. These piers are very thin. This is probably one of the most economical vaulted churches ever erected during the Middle Ages. The chancel alone is used, the nave serving as a stable! There is some good old domestic work, chiefly in brick, in the town, and the ancient fifteenth-century brick walls are the earliest example of "Flemish bond" I have ever seen.

The last church with which I shall have to trouble you with any detailed account is the cathedral or church of St. John at Bois-le-Duc, in North Brabant; and I shall dwell for some time upon the consideration of this noble edifice, because it may be looked upon as the only perfect realisation of the ideas of a Dutch Mediæval architect passed down to our times. It is possible that the great metropolitan church of Utrecht may, in the days of its splendour, have surpassed that of Bois-le-Duc, to which it bears so striking a resemblance, but unfortunately the nave of this noble cathedral no longer exists; its fine tower has been robbed of a portion of its height; and the choir and transepts, which alone remain to attest its former grandeur, have been fitted up in a style so barbarous, and are so forlorn, desolate, and neglected, that they are a sight that can only fill one's mind with sorrow and regret. It is true that a kind of restoration has been commenced, but this promises rather to add to the havoc and destruction, for a beautiful little doorway which leads to the remains of the cloisters has been "restored" by having the delicate sculpture of its tympanum cut away and replaced by a vulgar representation of a very badly-bound Bible surrounded by rays. The interior of the church more resembles a lecture-theatre than anything else, and the apse, which is walled off and full of decayed tombs, seems to be used as a kind of dusthole or receptacle for disused lumber. Now the cathedral at Bois-le-Duc has fortunately escaped many of the misfortunes which have befallen other Dutch churches, and so in its present condition may, I think, without doubt, be pronounced to be the finest church in Holland. In plan it consists of a nave with four aisles, transept with aisles, and a spacious choir with aisles, chevet, and eleven radiating chapels. Over the intersection of the nave and transepts is a lantern crowned with an ogee dome. At the west end rises a lofty tower, capped by a singularly graceful Renaissance spire of wood and lead. Attached to this tower is a single western transept, and at the west end of the outer south aisle is a curious small tower and spire. The tower and western transept are of brick, and formed a portion of an earlier church. They are Geometrical in character, and date from the commencement of the fourteenth century; whereas the rest of the church, which was erected between the years 1419–1497, is entirely of stone. Attached to the south aisle of the choir is a very large chapel covered all over with the most elaborate Flamboyant tracery and panelling, very French in appearance, and to the east of this is the equally elaborate basement story of an octagonal building, which could, I think, only have been intended for a chapter-house; and if so, it is the only example of an octagonal chapter-house out of England. This is now the cathedral church of the Roman Catholic diocese of Bois-le-Duc, or, as it is called in Holland, St. Hertzogen-bosch. I cannot, unfortunately, give you the dimensions of this magnificent church, but, judging from its appearance, I should say it must be about 400 ft. long, and, as far as I could measure by stepping it, the nave is nearly 45 ft. in the clear, and the height to the vaulting cannot be less than 115 ft. The exterior of this church is singularly rich in detail, and although late (it was erected between the years 1419–97. Cardinal de Granville erected this church into a bishop's see in 1560), is singularly pure and beautiful. The clearstories are supported by noble flying buttresses, which are in two ranges, and the buttresses are crowned with groups of pinnacles, their fronts and sides being adorned with niches and panelling work. All the windows have straight-sided canopies, the tympana of which are adorned with sculpture, representing ecclesiastics, knights, ladies, and, in the nave, grotesque subjects. The two transept ends are most noble compositions. The northern one has a splendid portal, and the southern an open porch with two lofty arches. Both are adorned with Scripture, but that on the north side has been restored under the direction of Messrs. Hessemans & Venneman, the architects to the cathedral chapter; and although the ancient sculpture has been copied with some amount of faithfulness, the modern figures which have been added are far from satisfactory. It is difficult to convey by any description the effect of the interior of this church; it is grand and impressive to an extraordinary degree. The piers, which have lofty bases, are a continuation of the arch-moulds. The triforium consists of very rich pierced panelling, and the whole wall-space is covered with tracery, which in the chancel is arranged in Geometrical patterns, and in the nave is Curvilinear. Over the crossing is the lantern, which is wonderfully cleverly arranged. It is an irregular octagon, the cardinal sides being twice as long as the oblique ones. These oblique sides are blocked by octagonal turrets, but the others are pierced by windows, which, by a singular arrangement of hipping away the roofs of the nave, choir, and transept, are brought down to the very crown of the arches, thus admitting a flood of light into the very centre of the church. The effect of this is perfectly charming. It avoids that dark blank space which usually intervenes between the windows of a lantern tower and the crown of the arches of the crossing. The furniture of this fine church is even more interesting and splendid than the building itself. At the west end of the south aisle is the baptistery, which is separated from the church by a metal screen. The font is probably one of the very finest in existence; it is unusually large, and, together with its canopied cover, is entirely of brass, richly gilt. The lever which swings off the cover is the most elaborate piece of fifteenth-century metal-work I have ever seen. It is composed of iron and latten; the more delicate portions of the detail are of the latter metal. It would be impossible to give any adequate idea of this beautiful and sumptuous article of church furniture by description. I may, however, explain that the figures surrounding the base, which are perfect examples of modelling, represent the cripples at the Pool of Bethesda. In the lowermost niches of the cover the baptism of our Lord by St. John, and the Annunciation, are represented. In the upper series of niches are the four Doctors of the Church, and the top niche is filled with a figure of the Eternal Father in the attitude of benediction. The whole is completed by a finial representing the Pelican in her piety. The sponsors' candle sconce, the crysm-box, and shelf for holding the font-cover when it is swung off the font, are all ancient and most interesting. There are two other fine examples of Gothic furniture in this church, and there are a beautiful lampadarium or chandelier (hanging in the side chapel before mentioned), the centre of which forms a canopied niche containing the statue of a saint, from the base of which spring the candle-brackets; and the choir-stalls, which look as if they were earlier in date than the present building. The rest of the furniture of this church is in the most sumptuous and magnificent style of the Renaissance. The organ-case, which is 80 ft. high and nearly 40 ft. wide, is built of solid logs of oak. It is dated 1602; it is a most noble composition, enriched with figures (many of which are life-size), arabesques, foliage, grotesques, and architectural ornament beautifully designed and executed in the most spirited and masterly manner. This organ is one of those wonderful productions of the earlier Renaissance age which seems to have been carried out quite regardless of expense, labour, and time. To give you some idea of its wonderful richness, I should state that the flutings of the quasi-Corinthian columns supporting the upper portion of the organ "towers" have delicate incised enrichments running up them. The pipes are very skilfully arranged; in the "flats" they are left in white metal, with the tongue chamfer alone gilded, but in the "towers" the centre pipe is gilt, and is embossed, twisted, and ornamented. The choir organ is rather later in date than the great organ, but equally splendid. The organ at Bois-le-Duc possesses what every organ-case ought to be provided with,—a ceiling or roof. If this is omitted in an organ the pipes draw in the dust, and the organ becomes clogged and is always out of tune, in addition to which, as sound ascends, the roof or top to an organ is as necessary as a sounding-board to a pulpit unless the organ is under ground. The tone of this Bois-le-Duc organ is as magnificent as its appearance,—vastly, to my mind, superior to the Haarlem one. It does not, it is true, imitate thunderstorms, waterfalls, or stone rolling down the hill, but it has a grand, rich, diapason tone, which, it seems to me, is what one wishes to hear upon an organ, which is, after all, a musical instrument, and not a box of conjuring tricks. The pulpit is in the same style, and nearly as richly carved as the organ; and the side screens of the choir and chapels are composed of oak panelling about 3 ft. high, and upon this rest brass-gilt balusters beautifully moulded, the whole being crowned by rich cornices carved with arabesques and foliage. The altars are not worthy of such a magnificent church; they are late Renaissance, and rather poor and uninteresting. Originally, there was an altar against every pillar of the nave, the piscinæ and ambries of which remain.

I now have a sad tale to tell. This church, until five or six years ago, possessed a magnificent rood-screen of marble and alabaster, a worthy companion to the pulpit, organ, and font; but, alas! under the absurd plea of restoration, this fine work of art was removed, and is now in the South Kensington Museum! I was told that the architects to the Dean and Chapter absolutely advised the removal of the organ and pulpit, as being out of place in a Gothic church; but this advice was fortunately not taken, chiefly owing, I think, to the expostulations of Mr. Cuypers, who, when consulted as to his opinion of this restoration, said, — "Gentlemen, you should instruct your architects to take away everything which they have put into the church, and to put back everything which they have taken away." To a certain extent this advice has been acted upon, for the modern Gothic bishop's throne (a preposterous structure about 60 ft. high) has been removed from the choir, which it disfigured. I wish I could say the same of the statues placed in the niches of the choir-piers, and Messrs. Hessemans & Venneman are now turning their attention to the windows, most of which had been robbed of their tracery. This they are reconstructing very creditably, and the windows of the choir and transepts are being filled with stained glass, which is not so bad as most Continental glass, and the windows of the nave are being filled with grisaille, which is decidedly good. The vaulting of the church is decorated with a kind of thistle-pattern scroll, painted in green, yellow, dull red, and black,—very effective and striking. This has been excellently restored some twenty-five or thirty years ago, though M. Venniman quite laughed at me when I said so, and showed me some decoration which had been done under his direction in a chapel, which struck me as being the most abominable use of colour I ever saw in my life. I do not wish to speak too strongly about Mr. Venniman, as he was very polite and obliging, but I cannot help saying that it is a pity, with such an admirable restorer at hand as Mr. Cuypers,—and in saying this I do not give you my own opinion, for Mr. James Brooks told me that he was delighted with Mr. Cuypers's restoration at Maestricht,—that the Dean and Chapter of Bois-le-Duc should have entrusted their cathedral to Messrs. Hessemans & Venneman for restoration. Bois-le-Duc is not rich in domestic work, but there are two wooden houses which are said to date from the thirteenth

century. They are certainly, in appearance, the earliest timber houses I have ever seen. I regret that my time will not allow me to say more of the domestic architecture of Holland, but that is a subject which would of itself require a paper; neither have I touched upon the Renaissance buildings in Holland, nor the revival of Gothic architecture, which has produced several fine modern churches, especially the new R.C. churches of Vechel, Eyndhoven, and Breda, by Mr. Cuypers. In conclusion, I think the ecclesiastical architecture of Holland during the Middle Ages, although it cannot be considered a success, owing to its want of originality, is worthy of study, because it shows how well thoroughly plain buildings may be made to look, and that grandeur may be obtained without richness of detail or great solidity. There is a breadth of treatment about these Dutch churches which is very suggestive, and an entire absence of that busy prettiness which is the bane of modern architecture. And I feel sure that any architect who has to build churches in large manufacturing towns would find a careful study of Dutch architecture of great use to him. The very failures of these Mediæval architects are instructive; for, although it is always more agreeable to contemplate success than failure, yet the failures of men who have striven bravely are worthy of admiration, because the nobleness of their strife has given to their failure the very nature of success.

MOVEMENT IN INDIA.

As has been already reported, Bombay is to have an equestrian statue of the Prince of Wales, the workmanship of Mr. Boehm, and the gift of Sir Albert Sassoon. The Prince is said to have expressed himself gratified that the memorial of his visit should take this form; and it has been proposed, in more than one of the large Indian cities, that efforts should be made to procure *replicas* of Mr. Boehm's work, for erection in their own midst. In several of the places which have been visited by the Heir Apparent, there are balances still in the hands of the reception committees, and it is thought that these balances might form the bases of memorial funds to commemorate in this or some other equally conspicuous manner what is undoubtedly an important event in Indian history.

The Duke of Buckingham has just returned to Madras, after a protracted visit to Calcutta. During his stay he carefully inspected the Calcutta Waterworks, and twice visited the head works at Miranapur. He also inspected several of the minor stations, and is said to have displayed a thorough acquaintance with the subject of supplying water to large towns which considerably astonished the engineers. As he had previously expressed himself dissatisfied with the Madras supply, the local journals anticipate some benefit from his trip to the metropolis.

Scindiah has given a lakh of rupees (10,000*l.*) to the architect of the new palace in which the Prince of Wales was received. The architect is a descendant of Jean Baptiste Filose, an Italian who entered the service of the Gwalior princes four or five generations ago, and whose descendants have always been held in high favour at the Mahratta court. None of the family have intermarried with the natives, and the present Signor Filose was educated in Europe.

Messrs. Glover & Co., contractors, of Bombay, have received a telegram from the Government of India, informing them that their tender for the Scindiah State railway has been accepted. This contract is for a broad gauge line, seventy-five miles in length, from Agra to Gwalior. Among other heavy works, it includes a viaduct across the river Chumbul, consisting of fourteen spans of 200 ft. each, the piers being about 115 ft. high.

By way of commemorating the Prince of Wales's visit to India, Raj Dunput Sing Bahadoor has offered the Bengal Education Department a scholarship of 150*l.* a year, tenable for three years. It will be assigned to the school of practical science which the Indian League means to start in Calcutta. There is abundant need for this and all similar endowments in India, and it is to be hoped that many more of them will be given by intelligent princes and zemindars. We may presume that these gifts, which have been so liberally bestowed in memory of the Royal visit, are not fettered by harsh restrictions, and are as open to the competition of Eurasians as of pure-born Hindoos. In that case they may be the means of doing great good, and of benefiting India by rousing the dormant energies of a clever but very unsatisfactory and listless section of the Indian community.

His golden-footed and elephant-controlling Majesty of Burmah intends to construct a railway from Mynjan to Mandalay and Bhamo. The route selected is one in which very few engineering difficulties will be encountered. The contract has been given to an Italian firm, who have undertaken to complete it in three years from the date of commencing the line.

Mr. Adams Acton, sculptor, now of Bombay, has been commissioned to execute a bust of the Prince of Wales for the public library of Jullundur. The bust is a present to the library from two of the native sirdars.

Sir Arthur Cotton has sent out a long letter to one of the opponents of the Madras Harbour project, in which he commends the scheme of the unsuccessful competitor, and condemns Mr. Parkes's plans, which have been sanctioned and are being carried into execution. The document, which is one of those of which "you can make any use you please," has, of course been published, although it is not likely to fulfil its author's anticipations and lead to the stoppage of the work. He protests against the authorised scheme:—1st. As being open to seaward, so that there never can be smooth water in the harbour when there is any sea in the bay; 2nd. Because it will be difficult of access in stormy weather,—*i.e.*, because vessels cannot go out and in to it in all winds and seas; 3rd. Because it is insufficient in space, and makes no proper provision for the vast future increase of shipping at Madras. On this point he rather intemperately says:—"To project any work whatever on the basis of present traffic is the greatest possible mistake, *and shows an officer quite incompetent to project works.*" The blunder, however, has not been committed, and even if it had, Madras shows so few signs of development into a great port that Mr. Parkes may rest at ease respecting his professional reputation. 4th. Because in a sanitary point of view the new harbour will be an insufferable nuisance; and 5th. Because it is a needless waste of money. Having thus disposed of Mr. Parkes, Sir Arthur advances a scheme of his own. He is uncertain whether the form of the breakwater should be a perfectly straight line parallel with the coast, a moderately curved line, or a straight line with wings running east and west. As to the mode of construction he proposes "casting loose stones with outer ones of large dimensions. It is quite certain that no sea in the bay would move a quarried stone of 50 tons, on a slope of little more than 45°, perhaps 60°. If the sea moved such stones it would only be to pack them till nothing but blasting would extract one. In 7 fathoms I am satisfied that no stone of 50 tons would be displaced. If, therefore, the work was carried to within 2 fathoms of the surface with the smaller materials, and covered on the outside and top with large, the section of the work in 7 fathoms would not be much more than 300 square yards, or 400 tons per yard. One of the unaccountable fancies of civil engineers at present is, that it is necessary to go to a great expense in order to go to a far greater to put them together again so imperfectly that it requires three or four times as much material to make anything like a secure work. They are beginning now to get over this pure fancy, stones of 100 tons having lately been used. The hills of Madras afford the most perfect quarries, and will allow of a working face of 100 ft. or 150 ft., and mines of 5,000 lb. or 20,000 lb. of gunpowder (what a crash!) and with a canal to the beach at Madras, the cost of the stone would be exceedingly small." We cannot quote further, but may simply add, that Sir Arthur Cotton has forwarded this communication to Madras because the progress of the present work "is a continual distress" to him.

New Pulpits.—A carved stone pulpit has just been erected in Boldre Church, Hants, in memory of the late Rev. C. Shrubb, who was for more than half a century vicar of the parish. The pulpit has been executed by Mr. Cooke, of London, in Bath stone, from designs furnished by Mr. Norman Shaw.——Sir Gilbert Scott has been commissioned by the family of the late Dean Hook to prepare a design for a memorial of the Dean separate from the public one. It will take the form of a stone pulpit in Chichester Cathedral.

RESTORATIONS AT THE CHURCH OF ST. MARY, ALDERMARY.

The last of the services in the church of St. Mary Aldermary, Queen Victoria-street, previously to its being closed for extensive alterations and repairs, took place on Sunday week. The works, which will involve an expenditure of about 12,000*l.*, are at once to be commenced, and, as a preparatory step, the present interior fittings, which are of considerable value, were last week sold by tender, and are now in course of removal. It will be seen, from the nature of these old materials, that the interior of the edifice is about to undergo a complete reconstruction. The fittings were divided into sixteen lots; the most valuable of which was the ornamental and carved altar-piece, with fluted columns and tablets, on which are inscribed the Decalogue and the Creed. They also include the oak moulded panelling round the walls of the church; the whole of the pews, also in oak; together with an old oak moulded and glazed screen across the church; the front of the gallery (which is to be altogether done away with); the oak enclosure to the altar space, with the marble paving in front; and also those portions of the pulpit structure containing the reading-desk and clerk's desk; but the pulpit itself, which is of elaborately-carved oak, is to be retained, and re-erected in the church, as re-arranged. The principal item in the work of restoration externally will consist of the re-facing of a considerable part of the upper stage of the tower, and the building of new turrets, more ornamental than the old ones in their architectural character. The walls and windows of the edifice will also be restored and renewed in places where decay has affected them; and new railings will be erected at the Watling-street and Bow-lane frontages. Internally, there will be extensive structural alterations, necessitating a certain amount of excavation. The church throughout will be fitted with low, open benches, and the floor of the nave and aisles will be laid with tiles. The structural alterations will include the formation of an entirely new and much enlarged chancel, approached from the nave by a flight of five steps, paved with polished Sicilian marble. Each side of the chancel will be fitted with clergy and choir stalls, in carved oak, and over the altar-table will be a sculptured reredos. The mural decorations will be of an elaborate character, and in the windows stained glass is to be introduced.

The alterations and restorations are by direction of the Church Repairs Committee of the united parishes of St. Mary Aldermary, St. Thomas Apostle, St. Antholin, and St. John the Baptist, and will be carried out from designs prepared by Messrs. Tress & Innes, architects; the contractor being Mr. Fish, of Pimlico.

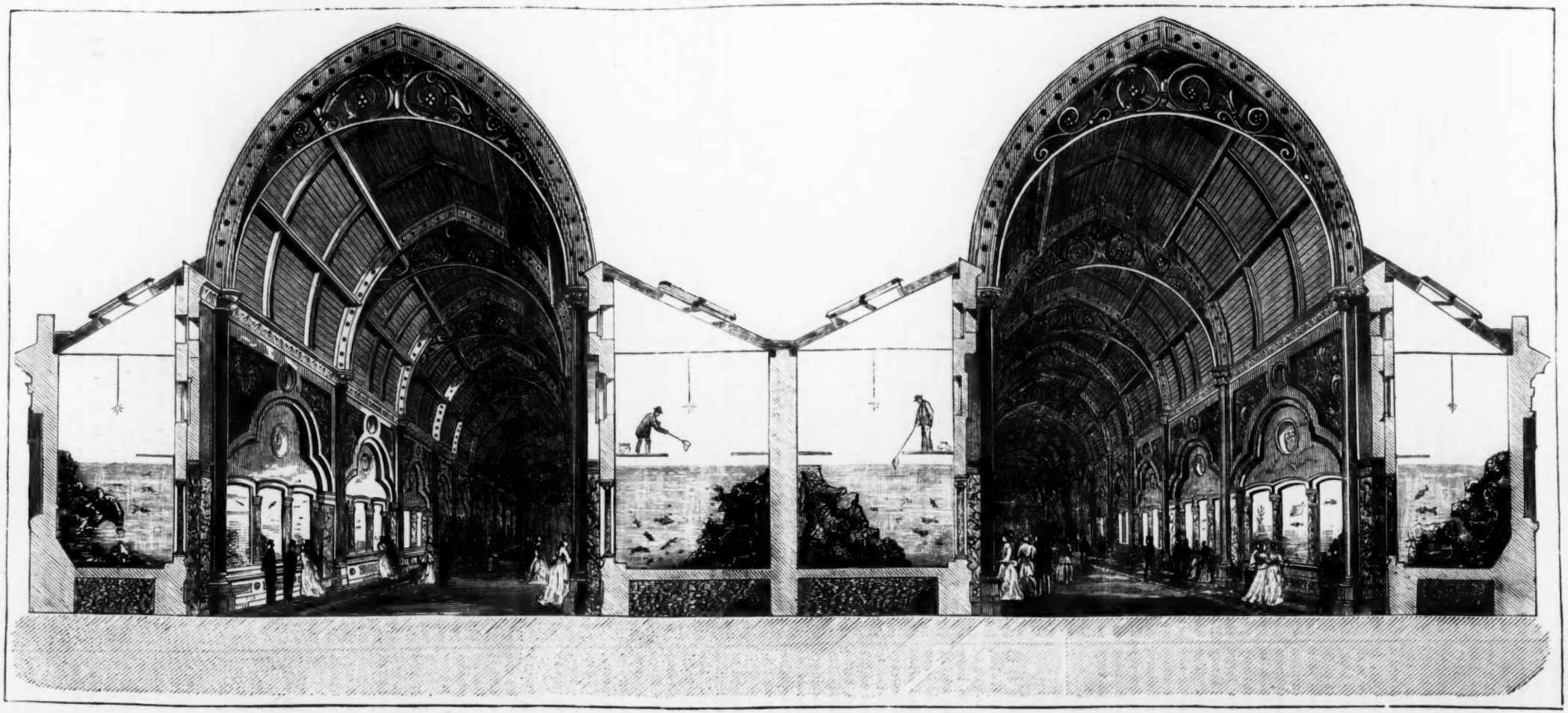
THE SURREY ARCHÆOLOGICAL SOCIETY.

The twenty-second annual general meeting of this Society was held on Wednesday, last week, in the Council-room, 8, Dane's Inn, Strand. Mr. Joshua W. Butterworth, F.S.A., member of the Council, presided. The report stated, amongst other things, that—

"The Council wish to direct the attention of the members to the following resolution which they passed on the 16th June last, and which, it is believed, will be approved by the Society:—'That this Council, being informed that it is proposed to make certain alterations in Newdegate Church, desire to express their hope that the main features of archæological interest in the building may be preserved. They trust that the west gallery, which is a good specimen of woodwork of its date, will be retained, and this, they consider, can easily be done without interfering with the appearance of the church, by reducing it somewhat in size. They also hear, with great regret, that the proposed addition of a north aisle will necessitate the destruction of the wall-painting on the north wall of the nave, it being a very interesting example of a class of art now becoming rare, and their appreciation of it having been shown by the publication of Mr. Waller's excellent paper upon the subject, with an expensive illustration, in the last volume of the Society's proceedings. They hope that some other scheme may be devised for affording increased accommodation, or that, at any rate, the painting will be preserved and transferred to the new wall.'"

The patron, president, vice-presidents, and retiring members of the Council were then re-elected, and Dr. Alfred Carpenter, F.R.S., and Mr. S. W. Kershaw, M.A., were elected to supply vacancies.

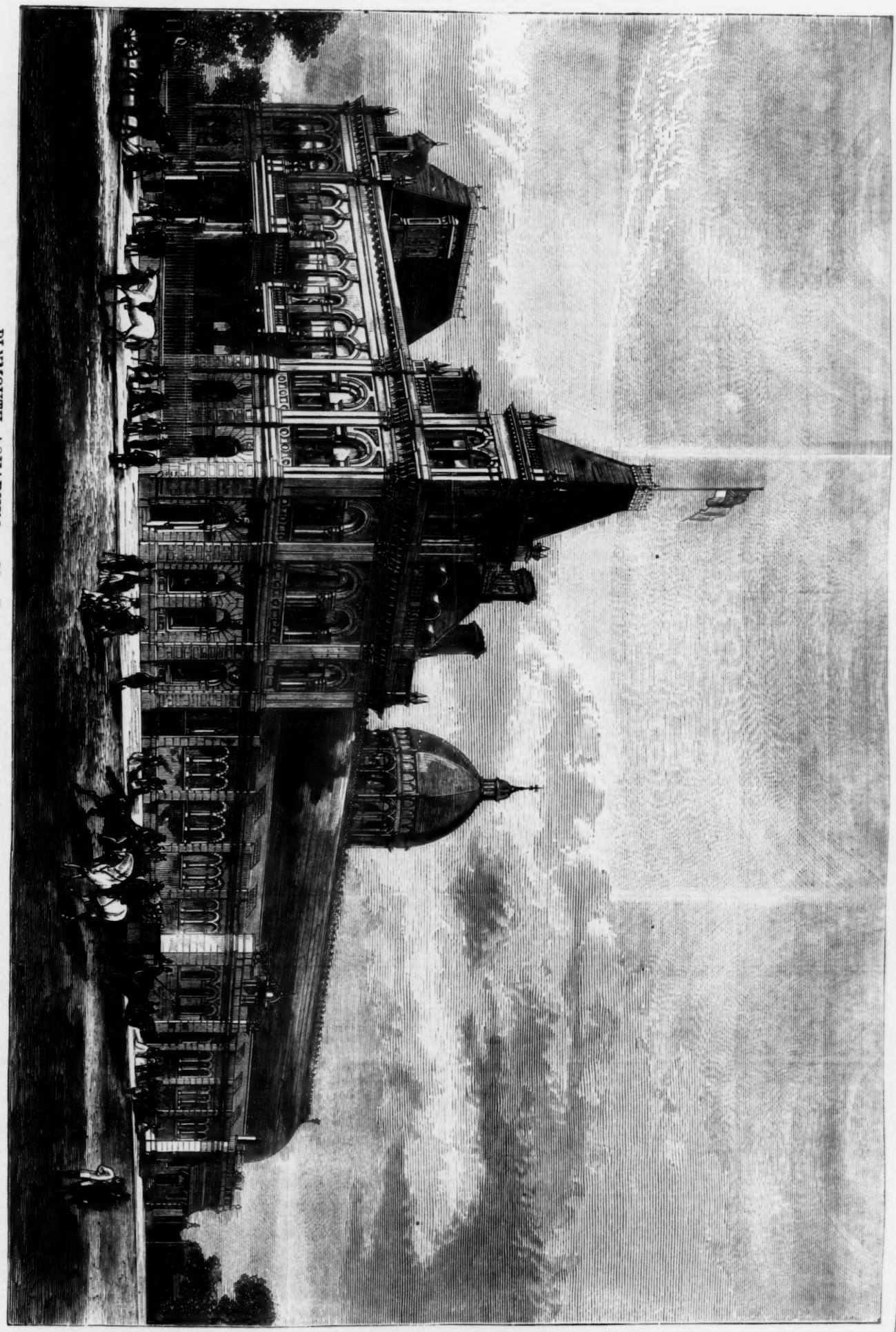
Mr. W. F. Potter moved, and Major Anderson seconded, that Messrs. Curling, Hanbury, and Hovenden be the auditors for the ensuing year. Carried. Mr. W. Tayler, F.S.A., F.S.S., then moved that the best thanks of the Society be given to Mr. Hayton, the hon. sec., for his efficient service during the past year, which was also carried unanimously.



PLYMOUTH AQUARIUM: SECTION THROUGH TANKS.

PLYMOUTH AQUARIUM.

Our illustrations represent the exterior elevation, and the interior transverse section of the proposed aquarium for Plymouth. From the latter it will be seen that there is a somewhat novel arrangement of the tanks. There are two main corridors running parallel to one another, and the tanks down the centre are placed back to back, so that the supply of water can be effected with only one set of pipes. This seems an improvement, as not only can the water-supply be economically arranged, but the attendants can more easily feed and superintend the little creatures placed under their care. The whole building is about 300 ft. long by 100 ft. wide. At the end shown on the accompanying view, there are refreshment-rooms, up-stairs dining and reading rooms, waiting-rooms, and other usual conveniences. The main entrance, which is through this end of the building, leads into a covered hall, and on each side of the hall are the ends of the two corridors above referred to. A concert-hall, about 80 ft. by 50 ft., with a domed roof, is placed in the centre of the main building, and the corridors from both ends lead to this hall. On one side of the building there is an opening leading to a conservatory and fernery, with cascades and rockwork, and beyond that to a skating-rink. Thus it may be said that while the physical enjoyment and muscular development of the visitors will be provided for, the aquarium proper may be made to educate their æsthetic and scientific tastes. These designs are understood to have the approval of the local supporters of the project, but we hear that a difference of opinion has arisen as to the site to be chosen: as soon as a final selection has been made, the buildings will be proceeded with. The designs have been jointly prepared by Mr. A. Bedborough, architect, and Messrs. J. E. & A. Dowson, C.E.



PLYMOUTH AQUARIUM.—MR. BEDBOROUGH, ARCHITECT; MESSRS. DOWSON, ENGINEERS.

CASTLE RISING.

Castle Rising, probably so called from its position on ground that is high or rising compared with the low levels of the district, stands about two miles from the estuary of the Wash upon its eastern or Norfolk shore. Half a mile north of the village a large tract of low land is traversed by the Babingley river, and it is evident that before this part of the country was drained and reclaimed by tillage the approaches to the village upon at least three sides, the north, west, and east, were almost impracticable. These considerations probably governed those who chose Rising as a residence. The soil is light and sandy, like that of the Dunes of Holland, but contains just enough of vegetable mould to support a growth of turf. The trees are chiefly ash and willow of very large size, and upon the slopes of the castle are some noble and very ancient thorns. The richness of the vegetation in and about the village is in favourable contrast with the dreary and barren heath land by which it is surrounded.

The earthworks are on a large scale, and probably the remains of a great English residence, the centre of a large estate; circumstances which no doubt led to the adaptation of this position for the Norman fortress whence the village has derived the prefix to its more ancient name.

The central and principal division of the fortress is composed of an irregular oval area about 67 yards east and west by 80 yards north and south, contained within a broad and lofty bank, which, in its turn, is surrounded by a very formidable ditch. Outside this ditch, covering the east face, is a subsidiary work, also within a bank and ditch. It is in form nearly a parallelogram, but its sides are somewhat irregularly convex, and its angles rounded. Its north end is about 60 yards and its south 70 yards broad, and its length of front 90 yards; but the ends are inclined, so that where it abuts upon the main ditch it is about 80 yards.

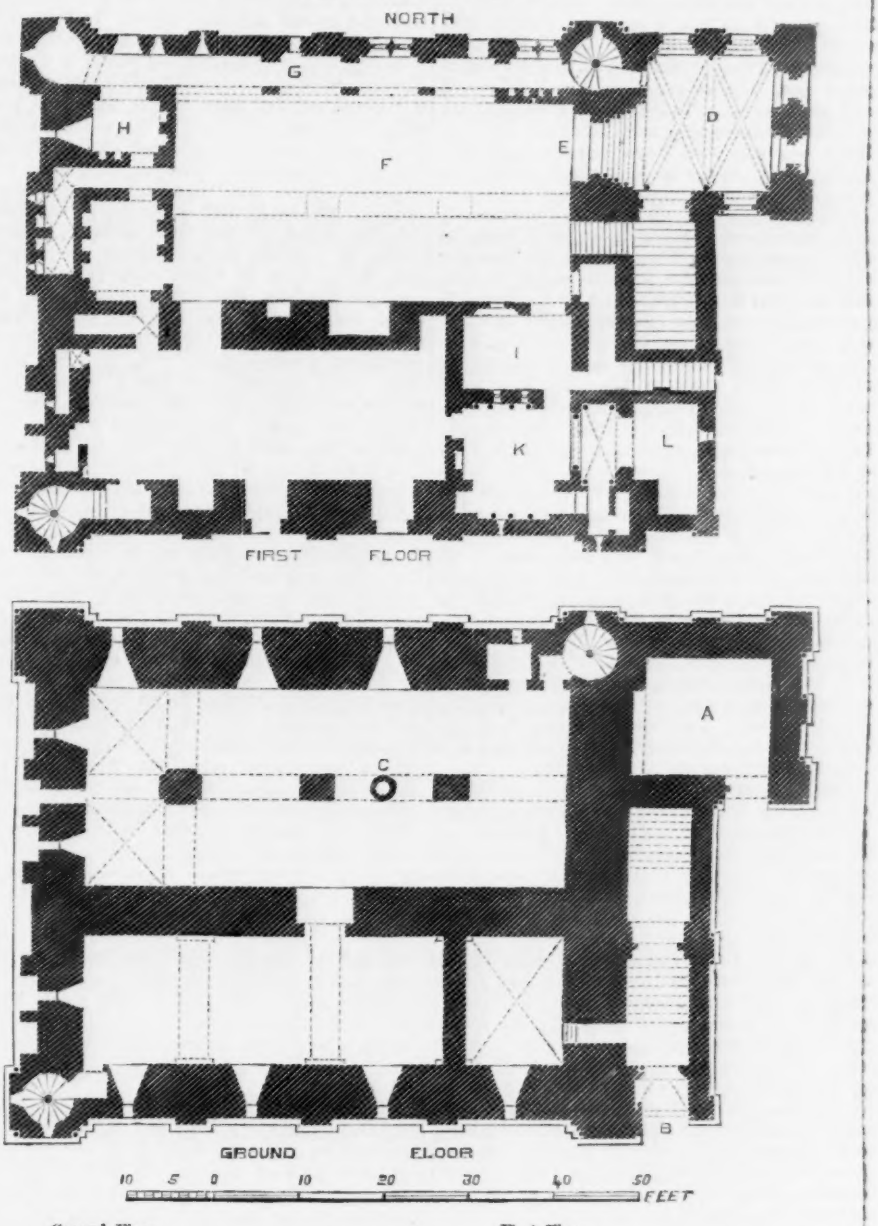
This is balanced by a corresponding earthwork on the west point of the central work. This earthwork is about 100 yards north and south by 30 yards broad, and is also contained within a bank and ditch. The ditches of these earthworks do not actually run into the main ditch. A narrow causeway of earth is left between them. The whole exterior girth of the ditch is reported to be 10,803 yards. The central earthwork is about 30 ft. high from the inclosed area, and outside is about 60 ft. above the bottom of the ditch. It is about 15 ft. wide at the top, and, being composed of light soil, has a considerable slope. The banks of the outworks are not so high, being about 20 ft. inside and 40 ft. outside. Those to the east are, however, higher, and at points nearly as high as those of the centre. The westward work is altogether of a lighter character, though still of great strength. The works cover about 13 acres. They are wholly artificial.

The main entrance was from the north, along the edge of the counterscarp of the main ditch, and it thus entered the eastern outwork. Near its centre the road crossed the ditch by a bridge, and entered the central ward by a notch in its eastern bank. The western outwork seems to have been entered from the central ward by steps up and down the bank, connected probably with a light bridge over the ditch. It may be, however, that it was used only for cattle, and had no direct entrance from the central ward.

It has been thought that these earthworks are of somewhat different dates, and that the central is the oldest. The circle, or irregular oval, with a bank and ditch, with or without a mound, is a not uncommon form of earthwork in England, and is probably the work of the English in the seventh or eighth centuries. That is to say, where the work is on a low site, and the form not governed, as in British works, by the outline of the ground. These English enclosures rarely stand alone. Usually there were one or more appendages outside, and abutting upon the main ditch, as at Laughton and Kilpeck, probably additions, but not much later than the main work. They were also usually at no great distance from the parish church. From the tendency of the outworks at Castle Rising to the rectangular form, they have been supposed, by good authority, to be Roman, and the Romans had no doubt a settlement at Brancaster, about fifteen miles to the north. But works probably Roman seldom if ever are composed of earthworks of this magnitude, the Roman custom, where great security was needed, having been to build a wall. Also, if the outworks be Roman, the central work must be British, which is scarcely consistent with what is known of the defences of that people. Most probably the central is an English work, and the outworks either of the same date or early additions by the same people. But, be the principal origin what it may, it is clear that here, as at Norwich, Clare, Hedingham, and Castle Acre, the Norman invader having grasped the estate of the English lord, proceeded, as in Normandy, to combine the new fashion of castle-building with the old defences.

The keep, the chapel, and the gate-house, the only parts in early masonry of which anything now remains, were probably among the works earliest executed. The *keep* is a very noble example of the rectangular Norman type. Not that its area, still less its height, would place it in the first rank, but to considerable dimensions it adds a degree of ornament rarely bestowed upon military buildings, and though a ruin, its parts are unusually well preserved, and excellent both in material and workmanship. Like Hedingham, it stands within, but not in the centre of, the inner ward. It almost touches the slope of the western bank, and is about thirty yards from the gatehouse and the eastern bank. Between the north and south banks it is nearly midway. It is in plan rectangular, measuring at the base 75 ft. east and west, by 64 ft. north and south, and, to the rampart walk, 50 ft. high. Each face is flanked by two pilasters, 7 ft. broad by 6 in. projection. These meet at, but do not cover, the angle, and the nook so formed is occupied by a shaft, not quite detached, and similar shafts take the place of the other angles of each flanking pilaster. Intermediate, on the north and south faces, are three pilasters of 3 ft. breadth, and there is one on the east face, all dying into the parapets. The west face is of a complex character. Upon it are two large recesses, 9 ft. broad and 2 ft. deep,

CASTLE RISING KEEP.

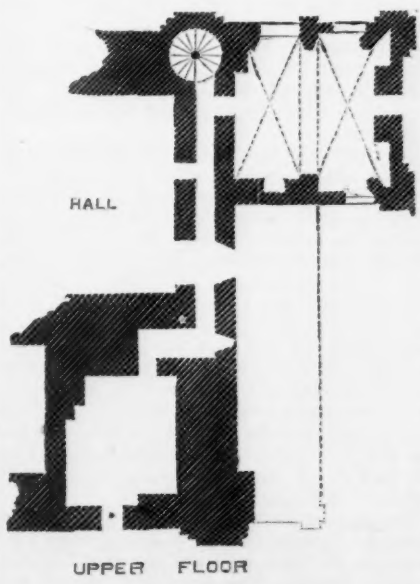


Ground Floor.

A. Prison.
B. Main entrance.
C. Well.

First Floor.

D. Vestibule.
E. Entrance.
F. Hall.
G. Gallery.
H. Kitchen.
I. Ante-chapel.
K. Chapel.
L. Upper part of fore-building.



of which one is arched over near the parapet level. There are besides four recesses, each of 4 ft. opening, by 2 ft. 6 in. deep, arched over a little below the first-floor level. All these five recesses have their soffits pierced by the vents of garderobes. The wall has only one slight set-off near its summit. The flanking pilasters have none, the others mostly two, but very high up. There was a square turret at each angle, now nearly gone. At the base of these turrets, the nook shafts ceased, and the turret angle was solid. The parapet is gone. Considerably below its base were round holes, apparently to take off the water. The walls at the base are, the north and east sides, 7 ft., the south 6 ft. 6 in., and the west 6 ft. thick, and this thickness is preserved to the top, or very nearly so. The east face is covered by the fore-building, here very perfect. This prolongs the north front by 20 ft., and the south by 9 ft. The keep has a basement at the ground level, and a first floor. At two points, however, the upper floor is subdivided so as to give a partial second floor. Part of the fore-building also, as at Rochester, has a second floor. The entrance is in the south end of the building, in which a straight stair rises to the main door of the keep, which is at the first-floor level. There are well-staircases, 7 ft. diameter, in the north-east and south-west angles of the keep, ascending by seventy-six steps from the base to the summit, and communicating with the first floor. It is, however, to be observed that the base of the well-stair is about 4 ft. above the ground level, so that it is entered by a stair of five steps, projecting into the rooms. This seems to have been the case at Dover, before the floor was raised. It is difficult to discover the reason for this.

The keep is divided into a north and south chamber by a cross wall, 6 ft. thick, which ascends to the roof. The two chambers are 58 ft. long,—the north 25 ft., and the south 16 ft. broad. The *north chamber* was again divided equally, longways, by an arcade of four lofty arches, of 11 ft. span, springing from corbels in the wall, and from three square piers, 3 ft. broad by 4 ft. The spandrel walls of this arcade supported the joists of the floor above. The three eastern arches and their two piers are gone. The western pier gives off two lateral arches north and south, dividing the end bay into two square spaces, which are vaulted and groined and carry upper chambers, which shorten by so much the upper great room or hall. This lower room is aired rather than lighted by three loops in the north and two in the west wall, placed high up and in splayed recesses, round-headed. There is also in the north wall a small lobby at the foot of the well-stair, from which there seems to have been a passage rising 3 ft. into a mural chamber 8 ft. above the ground. In the west end of the great chamber an interior door at the ground level has been broken. It has a pointed head, and is an insertion. Probably it represents a loop. A round-headed doorway of 4 ft. opening opens in a segmental recess in the cross-wall into the south chamber. The door opened towards the north, and was barred on that side. The recess is groined. The well is in the floor of the north chamber, between two of the piers, under the second arch from the east. It is 4 ft. diameter, with a pipe of ashlar rising about 3 ft. above the ground level.

The *south chamber* was crossed by three plain broad arches, springing from corbels high up in the wall, and carrying the joists of the floor above. The eastern bay, however, is vaulted and groined, and supports the chapel. The other two arches are broken away. This chamber has four loops to the south and one to the west. Its well-stair also has a small lobby in the wall 5 ft. above the floor. In the east end of the south wall is a door ascending four steps, which opens into the staircase of the forebuilding. Although this door, in its present state, is not original, it may be really so. There is one in a somewhat similar position at Dover.

The first-floor is also divided into two main chambers by the cross-wall, and each is shortened by the rooms cut off, in one at the east, and in the other at the west, end. The great chambers are, the north, 47 ft. by 23 ft., and the south, 42 ft. by 15 ft. The north room was the *hall*. It was entered from the vestibule of the forebuilding by a handsome main door, of 6 ft. opening, near the north end of the east wall. Close to it, in the same wall, is a second round-headed door, which descends by ten steps upon the staircase of the fore-building. This door is evidently an insertion in the place of a loop. A third and small door, segmental, opens into a narrow mural passage leading over the middle gate of the fore-building, and by a branch into the chapel. In the cross-wall a door opens into the south chamber, and near it is a deep round-headed recess, 5 ft. from the floor, perhaps a cupboard, and again a recess, 8 ft. broad and 5 ft. deep, at the floor-level, possibly for a brazier of charcoal, but without a flue. Near the east end of this same wall is a small window, a Decorated insertion, and near it a segmental door, both opening into the ante-chapel. The north wall is pierced by a gallery, 3 ft. 6 in. broad, of five bays, between each of which is a plain arch, reducing the way to 2 ft. 9 in. Two of these bays have coupled exterior windows, one pair square-headed, the other round-headed and trefoiled, and on each cusp a disc, as in the recess at Coningsburgh, producing a heavy effect. The fifth bay has a loop. Four of these bays open by large arches, at the floor-level, into the great chamber, of which this gallery thus formed a part. The eastern bay communicates with the well-stair. It is groined, and its side towards the chamber seems to have been partially closed, and there are three small shafts which seem to have dropped into the mural chamber below. They cannot be for garderobes, and their use is obscure. This bay has a very handsome window, of two lights, coupled, and the shaft common to the two is worked in a rather remarkable fret or knot. These windows had shutters. There is no trace of glass. The gallery, which is 62 ft. long, has a loop at its west end, and a rude opening, probably once a window, of three small lights, near that end in the north wall. The north-west aisle is occupied by a cylindrical shaft, 5 ft. 6 in. diameter, which commences with the floor-level, and is open like a fireplace. At the roof-level it is gathered in with brick, and ascends as a chimney-shaft. In its sides are four loops, in two tiers, besides six small round-headed niches higher up, probably for the escape of smoke and steam. At this end the gallery opens into a lofty vaulted chamber, in the east wall of which an opening has been broken into the hall, and in the south wall is a curious low segmental recess, of 10 ft. span and 3 ft. rise, partly walled up, and in the upfilling some small niches. The great height of this chamber, the vaulted roof, the shaft and steam-holes at one corner, the niches round it, and its position next to the hall, point it out as the kitchen.

In the west end of the hall a door leads into a room corresponding with the kitchen, to the south of it. This is 8 ft. by 12 ft., and has three niches in its west and two in its east wall. In its north and south walls are arches of relief, like that of the flat recess in the kitchen. The reason for these three arches, turned in three parallel walls, is not apparent. Two of these might serve to direct the weight of the wall above from the vault below upon the piers, but the third is in the cross-wall, which is solid. The south room had a timber roof, and was probably a sort of still-room, for light cooking or pastry. Between these two rooms a door from the hall opens into an L-shaped vaulted passage, ending in a mural vault, 10 ft. by 5 ft., in the west wall of which are two loops and two double garderobes.

The roof of the hall was of timber, resting on six pairs of principals, of which the corbels that carried the hammer-beams remain. Some are carved as male or female heads, and one represents an animal. The pitch of the gable is marked upon the east wall, across which, at the level of the corbels, is a bold band of chevron work, and upon this rests a window of 2 ft. 6 in. opening, which gave light from an upper mural gallery into the roof. In this gable a second opening, 7 ft. wide, has been made into the same gallery. This larger window cuts the chevron band, descending somewhat below it. It was evidently an insertion to give more light to the hall, and it is opened on one side instead of in the place of the small window, in order that it may be clear of the fore-building.

The *south chamber* was entered from the hall by a doorway 5 ft. broad, placed in a large recess 5 ft. deep. In the south wall are two round-headed windows, trefoiled, with discs on the cusps, and between them a fireplace and chimney-shaft have been inserted, probably during the Tudor period. There is also a sort of cupboard in this wall, and a door opening into a lobby 7 ft. by 3 ft. 4 in., which opens upon the south-west well-stair. In the east wall is a small door, a Decorated insertion, opening into the chapel. In the north wall, besides the door from the hall, are a cupboard and a small segmental door, opening into a mural garderobe in the west wall. In the west end are two small doors opening into mural chambers, each containing a garderobe lighted by a loop. It will thus be seen that all the garderobes are upon the west front, and there seem to have been others in the battlements above them. The south chamber had a lofty open roof like that of the hall, but high up in its west gable a window has been opened as though to suit an added interior gallery or balcony at the level of the room above the chapel at the opposite end. This window, however, is the only indication of such an insertion, nor are there any other windows or any traces of floor-joists, only below the window are some joist-holes. This window is of two lights, lancet-shaped and trefoiled. In the central spandrel is a peculiar ornament composed of four loops, which outside are replaced by a small circle. This window stands in a full-centred recess which may be original, but the window itself is an insertion.

Walled off at the east end of the chamber is the *ante-chapel*, 9 ft. by 13 ft., and vaulted. It is placed partly in the cross-wall and partly in the south chamber. It has a door and window into the hall, of which the latter seems an insertion. Also a door and two loops, of hour-glass section, in the opposite or south wall opening into the chapel. In the east wall is a door, whence a narrow passage leads upon the roof of the forebuilding over the middle gate.

The *chapel*, which could be entered from the hall either through the ante-chapel or round it by a mural passage, has but one original door, which is in its north wall. A second door has been opened, in the Early English period, in the west wall. The chapel is 13 ft. east and west by 14 ft., and has a flat timber ceiling. The southern side has a deep recess, let into the wall of the keep, and in it are the remains of a triple window, probably formed of three loops. In the two jambs of this arch are side recesses. High up in the north wall are the two hour-glass loops from the ante-chapel. The chapel has been much injured; but there are remains of a handsome arcade with detached shafts upon the lower half of the west and north walls, and in the south is what seems to have been a coupled window. In the east wall is a handsome arch of 7 ft. 6 in. span, with shafts in front of the piers with carved caps. This opens into a sort of chancel 5 ft. deep by 9 ft. wide, with nook-shafts. It is vaulted, groined, and ribbed. There is no boss, but about the intersection of the ribs is some rude carving, from which a lamp seems to have been suspended. There is a window to the east, now broken down, but which was probably composed of three coupled lights, and in the south wall is a recess with a loop. An attempt has been made, apparently in the Tudor period, to insert a fireplace in the north wall.

From the first floor the south-west well-stair leads to the roof only; but the north-east stair, in its way to the roof, has two side openings, of which the first, 2 ft. 4 in. wide, leads by a narrow passage up fourteen steps towards the ramparts of the vestibule tower. This is now blocked by the inserted vault, with which that building is covered in. Eight steps above this lower opening a second leads into a gallery in the east wall. Above this opening, seventeen more steps lead to the ramparts of the keep, which are 22 ft. above the level of the first floor. The eastern gallery is vaulted, and 32 ft. long. From one side of it a door enters the second floor of the forebuilding tower, and beyond it, also in the east or outer side, is a loop. In the west side are two openings, already described, which open into the gable end of the hall roof. At its south end this gallery makes a turn at right angles, and ends in a small bedchamber, 18 ft. by 14 ft., which is over the chapel, and has a window to the south. As the parapets are gone, and the ramparts not accessible, the roof above the kitchen cannot be examined; but there does not appear to have been any second floor in that quarter.

The *fore-building* is a very perfect and a very good example of this sort of appendage to a Norman keep. It is composed of three parts,—a lower staircase, an upper staircase, and a vestibule tower. At its south end is the outer gateway, at the ground-level, in line with the southern face of the keep. The portal is full-centred, and flanked by two columns beneath a plain abacus, from which springs the arch with a bold roll-moulding. There is no portcullis. The door opened inwards, and was strongly barred. The wall is 6 ft. thick, and the passage through it, inside the doorway, is segmental,

vaulted and groined. Within, the passage is 8 ft. wide, and contains the lower staircase of fifteen steps. In the inner face of the wall, over the doorway, is a large, deep recess, probably to lighten the weight on the entrance arch. On the right, or outer wall, high up, is a loop, and on the left, at the fourth step, a large door, already mentioned, opens into the southern chamber. It seems to be of Late Decorated date, and probably represents an original loop, or it may be a doorway. At the head of this first staircase is the middle or second doorway, of 5 ft. opening, also full-centred, with flanking columns. The head, also, has a bold roll moulding. The wall in which it is placed is 4 ft. thick, and the landing 5 ft. deep. The portal is recessed, and in the soffit in front of it is an opening, 2 ft. broad by 6 in. deep, a shaft or *meurtrière* from top of the wall, where is a walk. This seems to have had high parapets, and a loop looking down the staircase. The opening was for the defence of the portal. This door, also, was barred. Within it rises the second staircase, in the same line, of nineteen steps, 8 ft. wide, and ascending to the upper and inner doorway, the door of the vestibule. On the right is a second loop, on the left a clumsy door ascending to the hall, already mentioned, and evidently an insertion. The staircase is solid, containing no vault or chamber below. It was roofed with timber, at two levels, of a low pitch, divided by the wall of the middle gate, and leaning against the keep wall.

The doorway at the stairhead much resembles those below. It is set in a deep recess, has flanking shafts, and a roll-moulding round the head. There is no portcullis. The doorway opens into a chamber 14 ft. by 15 ft., which is the vestibule to the main entrance of the keep, and at the level of its first-floor. It has two windows to the north, two to the east, and to the south the staircase door and a window, which rakes the exterior of the outer wall of the staircase. These windows seem to have been of 12-in. opening, but have been enlarged. They are placed in deep recesses as in an arcade. In the west wall is the great entrance,—a noble archway,—deeply recessed, and flanked with four shafts on either side. The exterior arch is 10 ft. span, the doorway itself 6 ft. The plinths are unusually high, being 3 ft. The caps are fluted and cushioned. The outer arch is full-centred, the actual doorway segmental. The arch bands are worked in chevron and other mouldings. Close north of the great entrance a plain narrow door opens into the adjacent well-stair, but this is clearly an enlarged loop, which was intended to light the staircase. The original covering of this room, like its present floor, was of timber, but this has been replaced by an ill-executed vault of the Early Decorated period. It is arranged in two bays, the dividing rib springing from pilasters let into the north and south walls. Each bay is crossed diagonally by two ribs, springing from corbels of half-octagon figure. The vaulting obscures and spoils the old Norman details of this very handsome chamber.

Below the vestibule is the ground floor, probably a prison, a mere pit, 14 ft. by 16 ft., and 21 ft. high, aired by two loops very high up in the east wall, and possibly by a third in the south wall. In the west wall, the wall of the keep, is a lofty recess beneath the keep entrance, within which a hole has been broken. At present this chamber is entered by a door at the ground level in the south wall, but this is certainly an insertion. The original entrance must have been by a trap and ladder from the vestibule floor.

The second floor of the vestibule tower was 16 ft. square, and had four round-headed windows of 2 ft. opening, now converted into shoulder-headed windows. There are two in the north, two in the east, and one in the south faces, each in a plain flat-sided recess, 3 ft. broad. In the west wall, where is the entrance from the mural gallery, is a recess, 12 ft. broad and 2 ft. deep, above the grand entrance of the keep. Its angle is replaced by a nook shaft, the particulars of which show that though the walls and the position of the windows are original, the floor-level has been raised, and a fireplace inserted in the south wall. Like the vestibule, this room has had its flat timber roof replaced by a high-pitched vault in two bays, groined and ribbed, and with a dividing rib. All the ribs spring from semi-octagonal piers inserted into the old walls. This vault appears outside in the form of a high-pitched roof. It is of the age of that below.

The material of this keep is in substance flint rubble, coursed, but it is faced largely with ashlar; and far more attention has been paid to ornamentation than is usual within military buildings. The fore-building is faced wholly with ashlar, and richly ornamented. Over the outer portal are broad bands of hatched and chevron work, filling up an arcade of two arches, above which is a circle, with a centre carved as a head. The south-eastern angle is occupied by a nook shaft. The east front, the wall of the staircase, is even more richly wrought. Here are two arcades at different levels, corresponding to the level of each staircase roof, and above is a line of circles, with centres carved as heads. There is a notion that the mural passage over the middle doorway ended in a postern high up in this wall, whence a ladder could be dropped; but there seems no ground for this improbable opinion. Had there been such a postern, the two loops on the stair would have been arranged for its defence; whereas they are too high up to be used, save for light and air. It is curious that the fore-building should be so much more ornate outside than the keep; whereas at Dover and Rochester, where also it contained a chapel, it is outside remarkably plain. The subordinate staircases,—that is, those at the two angles,—are clumsily arranged. There is no arrangement by means of a landing to suit the steps to the level of the floors supplied. No doubt the main stair was that chiefly in use. The keep bears a close resemblance to that of Norwich, especially in the position of its kitchen, north gallery, and chapel. The fore-building also is on the same plan. The arches generally are full-centred, though a few of the doorways are segmental. Where the mural galleries are at all expanded in breadth, and in the door recesses of the cross-wall and of the outer entrance, the vaulting is lightly groined; and this, which occurs also in the Tower of London and at Rochester, produces a good effect, and takes off from the sameness of the barrel-vault. In the kitchen are piled up a heap of fragments of carved stones found in or about the castle. They are in all the styles,—Norman, Early English, Decorated, and a few Perpendicular. Probably some came from the chapel of St. Nicholas; many of them can scarcely have belonged to the keep. If Castle Rising was built by the architect of Norwich keep, it must be Early Norman, for Norwich was besieged 1076, at the revolt of Earl Guader, and Harrod supposes the present keep to have been then standing; but the ornamentation of Castle Rising looks much later, and on the whole there is no reason to refuse assent to the tradition which attributes it to William d'Albini, who died 1176. As usual, there are no subterranean chambers. The fore-building, though its three doorways had not, as at Dover, each a tower, had each a distinct defence. The outer from the battlement over the portal, the middle also from a battlement pierced by a shaft, and communicating with the keep, and the inner as a part of the vestibule tower.

The *gate-house* stands near the centre of the east side of the keep ward, in the earth bank which has been cut away to allow it to be built. It is 325 yards from the north-east angle of the keep, and of the same age. It is of the usual Norman pattern, a rectangular tower pierced by a passage, with an arch of 12 ft. opening at each end, set in the walls, of which the outer is 6 ft., and the inner 5 ft. thick. The arches are quite plain, without rebate or chamfer. The passage between the two is also 12 ft. wide and 13 ft. long, and had a flat timber roof, the floor of the chamber above, now removed. The outer arch has a portcullis groove, 3½ in. broad by 4½ in. deep, and square. In the north wall are two shallow recesses, of 4 ft. span by 1 ft. 10 in. deep. In the south wall is one similar recess, and a door of 2 ft. 6 in. opening, which seems to have led into a well-stair in the south-west angle of the building. In front of the outer gateway the approach, 15 ft. wide, lies between two walls, of which the southern still projects 15 ft. They probably protected the drawbridge, and between them was the bridge-pit. Beyond these walls is the great ditch of the place, here about 80 ft. broad and 30 ft. deep, crossed by a bridge in masonry, of two arches, of which the inner one is walled up. The open arch seems of the Tudor date, but the piers look original. The outer end of the bridge rests upon the counterscarp of the ditch, about the centre of the eastern ward.

The gate-house stood on the ground level, and, therefore, lower than the curtain of the *enceinte*, which was built on the crest of the earth bank. The original curtain, if one there was, as is probable, is entirely gone, and has been replaced by a brick wall of the age of Henry VII., also nearly all gone. Of this wall there remain, on the south side of the gate, about 12 yards. It is 2 ft. thick, but within was lined by an arcade 3 ft. thick, which carried the rampart walk, as at Southampton. These arches are 8 ft. span, and four-centred, with piers 3 ft. broad, and within each arch or recess was a loop. There remain three arches and a half. Besides this there is a fragment of curtain south-west of the keep, and traces of foundations along the bank.

In the keep or central ward, a few yards north of the keep, is a well, and further north are the remains of the great chapel. This was composed of a nave, choir or presbytery, and apse. The nave is about 12 ft. broad and 25 ft. long. The arch into the presbytery was 5 ft. broad, and across it is the base of a stone screen with a door of 3 ft. There was a south door and a north window. The font stood in the centre, near the west end. The presbytery was 8 ft. long by 9 ft. broad, with a loop to the south, and an arch of 6 ft. opening into the apse. The apse was rounded, and 8 ft. broad by 9 ft. long, and had loops splayed internally to the north and east, and probably to the south. It is said that the very early Norman font, now in the parish church, came from hence. The masonry of what remains of this building is of a rude character, and it is probably older than the keep. This is supposed to be the chapel of St. Nicholas mentioned in the records. At present its remains are niched into the bank, and it has the appearance of being the older of the two, though this can scarcely be the case. The sand of the bank is liable to be shifted by the wind, and as late as the commencement of the present century the central ward was much encumbered with it, and the keep more or less buried, so that this is probably the cause of the half-buried condition of the ruins of the chapel.

The keep, chapel, and gate-house are the only remains of Norman masonry at present seen above ground. The inner ward must have contained domestic buildings on a large scale, fit for the reception of royalty, but the foundations which remain on the south of the keep seem very late, probably of the Tudor period. They are said to be those of the constable's lodgings. There is no trace of masonry of any kind in the two outer wards.

The parish church, standing in the village of Castle Rising, is a fine example of the Late Norman style. Its west front, especially, is very rich, and it has a good central tower. The chancel is rather later. The font is very massive. Its square bowl is covered with carvings of an early character, and it stands upon a plain cylinder, properly copied from the original support. The bowl is said to have come from the castle.

Rising, or rather Snettisham, in which manor it is contained, was a part of the estate of Edwyn, a Dane, and a follower of Canute. So says Dugdale. In Domesday it is entered as a "bervite" of the manor of Snettisham. "*Huic manerio jacet una bervita Risinga.*" It had belonged to Archbishop Stigand, and, on his forfeiture, William gave it to Bishop Odo, then Earl of Kent. After Odo's fall, Rufus granted it to William d'Albini, the royal "pincerna," or butler, son of Roger, and whose younger brother Nigel was ancestor of the great house of Mowbray. The son of William was "William with the Strong Hand," the celebrated Earl of Arundel, and Lord of Buckenham, in Norfolk, who married Adeliza of Louvaine, the Dowager Queen of Henry I., and is the reputed builder of the keep before 1176.

Their son, a third William, died 1190, leaving a fourth William, who died 1221, and whose eldest son, a fifth William, died childless in 1224, when Rising came to his brother Hugh, who left four sisters, co-heirs, of whom Cecily had Rising, and married Roger, Lord Montalt. Their eldest son, John Montalt, died childless, and was followed by his brother Robert, who died 3 Edw. I., leaving Roger, who died childless 25 Edw. I., and Robert, who succeeded. This Robert de Montalt was a very considerable person both as a warrior and a statesman. He is locally celebrated for the winning of a very important law-suit against the corporation of Lynn for the tolls of that port and market in the reign of Edward II. Having no issue, he, in 1 Edw. III., sold the reversion of Castle Rising to the Crown, for the benefit of Queen Isabella, the "She-Wolf of France," with remainder to John of Eltham, the king's brother. In 1331 Isabella came into possession, and here lived in retirement to within a year of her death, which occurred at Hertford in 1358. Edward, with his queen, here visited his mother, in the fourteenth year of his reign.

John of Eltham having died childless, the castle came to the Black Prince, and became part of the duchy of Cornwall, and so descended to Richard II., who exchanged it with John, Duke of Bretagne, who held it in 1397, and occasionally resided there. It was afterwards recovered by the Crown, and granted to Edmund of Langley, Duke of York, from whom it passed to Edward IV., who again annexed it to the duchy, but the castle was probably then in a ruinous state. In the time of Henry VII. it seems to have been repaired. The roof of the keep was then covered with tiles, with great gutters of lead. In the reign of Henry VIII. it was again in decay, and the keep and gatehouse were roofless, and it would seem that the constable's lodging was the only habitable part. Finally, the king exchanged the castle manor and chase of Rising with Thomas Howard, Duke of Norfolk, and in 1693 it came to another Thomas Howard, ancestor of the Earls of Suffolk and Berks, one of whose descendants still holds it. As late as the 31st of Elizabeth there was a curtain-wall upon the bank which was in danger from the burrowing of the conies, and there was also a gatehouse and a bridge 90 yards long and 7 yards broad. Under the castle, by the tenure of castle-guard, were held the manors of Hunstanton, Reydon, and the Wottons.

1875. G. T. C.

"MODEL DWELLINGS FOR THE RICH."

AT the close of the paper read at the Society of Arts, and printed in our last issue, the following letter was read from Mr. Edwin Chadwick, C.B.:—

"I consider that the paper of Mr. White and his colleague, on 'Model Dwellings for the Rich,' opens up important sanitary and economical improvements for the benefit of the large class of the very moderately rich, and for professional persons who cannot individually help themselves, and who need collective aid and service from sanitary science and architectural art.

Dr. Richardson's paper on the construction of an ideal city, under sanitary science, a 'Hygeia,' has, I am glad to learn, given rise to suggestions from various quarters that the idea should not be postponed to an indefinite future, and that steps should be taken for its early practical realisation. Constructions on the principle advocated in the paper would enter into prominent consideration for such a city.

In my observation, however, most of the existing buildings on the 'flat' principle have sanitary defects which will require careful attention for their prevention in new buildings. During the cholera visitations, these classes of houses, in Edinburgh, Paris, and elsewhere, were marked by the excessive severity of the attacks upon the occupiers of the basements and the upper floors of these dwellings, or the attics; whilst the occupiers of the intermediate dwellings or apartments had an almost complete immunity from the pestilence. Much of such differences of sickness and death-rates between the upper, the lower, and the intermediate classes of occupiers is manifest in ordinary times. The comparative severity of attacks upon the occupiers of the basement tenements is attributable to the obvious inferior sanitary conditions belonging to them. The comparatively lower health of the occupiers of the highest tenements to the intermediate occupiers is ascribable to defects of ventilation, by which the attics are made inverted receivers, as it were, for the detention and accumulation of the vitiated warmed air ascending from the basement, as well as from the intermediate tenements opening into the common staircase. In tall town houses of the well-to-do classes, servants working in the lower rooms and sleeping in close attics suffer in their health proportionately to the greater amount of aërial impurities to which they are exposed. The remedy to be applied is that the rooms of each stage shall be provided with distinct means of ventilation from the out-door air, entirely independent of any supply from what I call the aërial common sewer,—the common staircase. With these precautions, the higher flats may have a superior supply of out-door air, above the lower stratum of air commonly polluted by street dust, and be placed in the best sanitary condition as to aëration. Each living-room should have its separate warming as well as ventilating apparatus for protection against rushes of cold air from the staircase.

There are now in course of construction some houses on a plan of hollow concrete walls and floors by Mr. Pope, the architect,—of which I hope we may shortly have an account,—that serve for the leading of warmed air to warm floors, also to warm walls, and effect a restoration of the Roman warmed floor and warmed wall, with great economy of fuel, specially applicable to this class of residences, and to the erection of a Hygeia, in providing a greatly improved quality of construction at a reduced cost. Blocks of these tall houses should be laid out, with sanitary precautions for the avoidance of the inclosure of deep reservoirs of stagnant and vitiated air, such as may be pointed out at the west end of the metropolis, and for insuring the free sweep of the wind, and external ventilation.

The economical construction, and the economical working of the lift for application to this species of dwellings, would be an object of great importance, and I should desire some particulars from the authors on these points.

The general advantages to be derived from the principle of construction propounded by them appear to be in giving to three or fourfold populations economically the advantage of the finest sites and aspects, a great economy of servant power, and attendance of a good trustworthy quality, now getting more scarce and more expensive; in giving parties facilities to leave their homes and enjoy vacations with greater comfort and security than at present. The reports of the occupiers of flats, in new West-end edifices, even as they are at present constructed and conducted, are in accordance with the representations of Mr. White and his colleague and with what I have heard of the experience in Paris and Vienna, and are highly favourable.

The deplorably-distressed capitalist, who, at this time, by lending a thousand pounds of his capital for a day, cannot get more than 2s. for its use,—actually not more than half the day's pay of a journeyman bricklayer,—may have the assurance that, by its application to the construction of a Hygeia, or in the minor way proposed, he may obtain safe and more satisfactory remuneration for his labour and thrift. The distressed and bewildered capitalists of Liverpool and Manchester who do not know where to get remunerative employment for their money may with profit obtain, by the means opened to them, better health for themselves, and a prolongation of their working ability, with better health for their families, in new suburban sites, than they can ever hope to have by continued residence in those pre-eminently heavily death-rated cities. Of this we may give them assurance.

EDWIN CHADWICK."

Mr. Lawrence said there was no doubt this system of building in flats would succeed to a certain extent in London, following the example of Paris and Vienna, but he did not think the time would ever come when the ordinary Englishman would adopt such a system, which simply meant the total absence of home life. It did very well for professional men, but was quite unsuited for families with children. A Frenchman's house was the last place he looked upon as his home, and you could not take up a child's book in French without seeing allusions to old gentlemen below complaining of the noise of children above. No doubt lifts would be a great accommodation, such as were in use in the Grand Hotel in Paris, which had sleeping-room for more than a thousand persons. On the whole, while there must be a certain demand for this class of buildings, he did not think noblemen would ever occupy them, or that they would come back to live in the heart of London as in former days, or as they did now in Paris, and for that reason he feared London would never be so handsome a city as Paris.

Mr. Tilghman said this system had been to some extent adopted in New York, and, as far as he knew, had succeeded very well. The lifts had been found a great advantage, and he understood that in business houses the upper floors were preferred, even at the same rents, on account of the greater amount of light and air which reached them. Some years ago a portion of Boston was burned down, and it had been partly rebuilt in large blocks, where lifts were almost universal, not only in business premises, but in hotels and boarding-houses. There was this great advantage in connexion with this plan, that where there was a lift there must be a steam-engine, and you could consequently warm the house by steam-pipes, to the great comfort of the inhabitants and the great economy of fuel.

Professor Kerr desired to guard against the supposition that the authors of the paper had exaggerated their case because one could not quite go all the way with them in all that they had advanced, any more than Dr. Richardson had in his "Hygeia," because he had gone further than many people could follow him. Custom was held to be binding in England until it was forcibly overthrown, and therefore all reformers had to state their case as strongly as possible in order to get a hearing. He recognised the maxim more, perhaps, in building than in anything else—"Whatever is, is right," and if London was found to be built on one plan, it must be taken that that was, on the whole, the best plan. All that could be said against it was, that in certain exceptional cases it would be advisable to build upon another system. Although it was complained that the working classes lived two or three families together in houses arranged for one family only, still a further examination would show that this was the right plan, and that the bulk of model lodging-houses had departed too much from it. It was in vain to contend that any better plan could be provided for London than that adopted at the West End. Every family man who could afford it would have his own front door, and would not like having any one else either under him or above him. It was easy to laugh at this as insular prejudice or John Bullism, but there was common sense at the bottom of it, and at any rate it could not be got over. At the same time, there was no doubt a large class in London who would be glad of the accommodation of chambers or apartments in flats, but the extent of this kind of accommodation required must be considered, and also how it was to be provided. These questions had been discussed many times, but he did not know that up to the present moment any completely successful solution of the problem had been given. The authors had not gone much into detail, no doubt feeling it preferable to confine the discussion as much as possible to the general principle. Efforts had been made to provide these kind of apartments in Victoria-street, and elsewhere, and he believed they had answered fairly well, but he was not sure whether they were not occupied almost exclusively by bachelors. At all events, ladies had a decided objection to going up a common stair, and this difficulty must be fairly met. Then, if two staircases were provided, there would be a difficulty in drawing the line who should go up the one and who should go up the other. Again, there was the question who was to live in the attics. People would never live in London as they did in Paris, a shoemaker or seamstress at the top of the house, and a nobleman at the bottom. He did not see, however, why large houses should not be built in such a way that they could be divided into two, with two separate entrances, one for the lower half and the other the upper, the advantage of which would be that all the family rooms must be on one floor, which would render them much more convenient for occupation.

Mr. Gruneisen was inclined to take a broader view of the question than had been adopted by the previous speaker, especially considering the enormous and constantly-increasing population of London. There had been a strong tendency for some years past for people to live out of town, and the suburbs had grown to such an extent as quite to belie their name. Many also had taken to live at longer distances, such as Brighton, but of late medical men had discountenanced this as being injurious to health. It would not do to take as a standard the spirit of exclusiveness which formerly prevailed amongst Englishmen. No doubt there were some who liked to surround themselves with high walls until their houses looked like lunatic asylums or prisons, but there was also a numerous class who would be very strongly disposed to live in flats. He had lived for five years in Paris *au troisième*, and was never more comfortable or independent. By having a *concierge* you to a great extent get rid of the nuisance of domestic servants, and, of course, in London, with lifts, the Paris system might be greatly improved upon. He believed if the plan could be carried out it would prove a great success.

Mr. Hale did not think the aristocracy and upper classes would approve much of the proposed system.

Mr. Strong wished to know how light and ventilation would be provided for in these large blocks if they were erected in a street so as to open at the back and front, but enclosed at the two sides. He had lived some time abroad, and had always found a great annoyance from the shafts leading to the larders, &c. There was but one shaft all the way up, which conveyed the smell from the larders and closets. The only remedy

would be to have separate shafts, which would require a great deal more room. Another objection was, that whenever you entered a flat you could tell what the occupants were going to have for dinner. The top floor was generally used as store-rooms, and for fuel; and the roof being flat afforded a means of escape from fire. After all, an Englishman's house was his castle, and he did not think men with families would like to live in flats, but he admitted their value in cases of bachelors and childless couples.

Dr. Wylde said some gentlemen thought there would be a great demand for this class of buildings, and others doubted it, but the question had been to a great extent answered already. When model lodgings for the poor were built they were occupied almost immediately; and there had recently been erected near Regent's Park some better class buildings called Cornwallis Mansions, six stories high, on the same principle, and they were all taken long before they were completed. He knew ladies who resided in them, and who were highly pleased with the accommodation. Rich men who lived in the squares would not take these flats, but there were many people, to whom economy was an object, who would be glad to do so. Domestic service would be greatly economised, because in such cases ladies and gentlemen would not mind opening their own door to visitors, and the kitchens being small, and well fitted with kitcheners or gas apparatus, ladies could do a great deal of their own cooking.

Mr. Hyde Clarke was glad that one or two of the speakers had come out of the realm of fancy into that of fact. It was all very well to talk about an Englishman's castle, but the question was, What kind of castle could he have? In such a place as London there were people having different requirements, and they all ought to be provided for. There were a great number constantly living in lodgings or chambers, and many who only came to town for a few months in the year. One great cause of the present taste for living in what were called in the North "self-contained" houses, was the window duty, which altered the whole construction of London during the last century. Previously to that the English had been a clubable people; for though they were independent, they also liked association. At the dissolution of the monasteries they were all occupied by families, and in the sixteenth century a large portion of the population lived in flats, exclusive of the inhabitants of the Inns of Court and Chancery. The circumstances of London were not those of the whole country, and there would always be in the metropolis a large number who must live in apartments of some kind. At one time every peer had a residence in London, but that had been greatly altered by the railway system; and many only came up for a month or two, and had no permanent residence here. With regard to the annoyance which had been spoken of from children, and so on, it must be remembered that at present there was a constant annoyance from noises next door, and that under an improved system of construction this would be greatly modified, if not altogether removed. Possibly, if one person in a house gave a party, it might be an annoyance to his neighbours, but not more so than was the case at present from the same event next door. None of these considerations were sufficient to detract from the value of a suggestion which was practicable architecturally, and would, no doubt, be economically advantageous. It was, after all, a question whether those who were compelled to live in apartments should do so in houses constructed for the purpose. The residential portion of London was continually being encroached upon, and if any one would walk about Bloomsbury and the surrounding district, he could not help being convinced of the value of the suggestion which had been made.

Mr. R. Manuel said the paper opened out a new vein of thought with regard to the construction of houses, but he feared the ideas contained in it were somewhat in advance of public opinion and insular prejudices. He hoped Mr. Smith, in his reply, would state how he proposed to ensure builders carrying out his plan, supposing it commended itself to the public. The defects of modern house-building were notorious, and he thought the Legislature might well pay more attention to the subject.

Mr. Robert Rawlinson, C.B., had listened to the paper with very great pleasure, but he knew his friends the authors were not so sanguine as to imagine they were going to subvert the existing order of things. They only proposed to introduce an improvement. Many persons came to London for short periods only, and if they rented a residence, it must greatly deteriorate while unoccupied. These block-buildings, properly arranged on sanitary principles, would offer great facilities to such persons, and there was plenty of room for them. He had been actually alarmed at the progress of building at the West End during the last ten years, and had been for a long time expecting some catastrophe to put a stop to it. But still it went on year by year, though it must come to an end some day in all human probability. The class of buildings run up in the suburbs was of the worst possible description, and he could not understand what the surveyors were about. Only last week two large houses, partly built, came down like a pack of cards; and not more than two years ago three or four houses, of rentals varying from 200*l.* to 300*l.*, suddenly collapsed in the same way. These proposed buildings would be thoroughly well built from foundation to attics, solid in construction, fireproof, and giving easy access to the upper floors by means of a lift. Probably the objection with regard to children was a valid one, but there would always be plenty of ordinary house accommodation for families with young children, and there were numbers of others who would appreciate the superior comfort of a superior class of buildings.

Mr. Baruchson said there were numerous lifts in constant use in London, as well as at the Grand Hotel in Paris, where they were now constructing a second one. He had lived a long time in Paris, and thought the annoyance from children and other causes was quite imaginary. Concerts and balls were constantly given without causing any inconvenience to those living underneath or above, and the same system of building was followed all over the Continent. At Naples he had seen a duke living on the ground-floor and a shoemaker at the top. The great objection was the staircase, and that would be overcome by the lift; but he did not know whether the grand folks on the first floor would like to go up in the same lift with the shoemaker who lived at the top. He believed this plan had been successful in Victoria-street, and it had long been followed in Edinburgh and Glasgow.

Mr. White said the common notion in England that in Paris houses the ground-floor was occupied by a tradesman, the first by a duke, the second by a marquis, the third by a baron, the fourth by ordinary people, and the fifth by labourers, was quite mistaken. As a rule, all the inhabitants of a house belonged to the same class in society, and if there were poor people at the top they went up by a separate staircase. He had lived ten years in Paris, and nobody ever complained of his making a noise, nor had he complained of his neighbours; neither had he been assaulted on the staircase, nor assaulted any one else. Since he had lived in London, however, he had been constantly annoyed by an abominable piano on one side of him, and by worse singing on the other.

The Chairman (Lord Alfred Churchill), in moving a vote of thanks to the authors of the paper, said he believed there was a great need for such buildings as they had described, and there was a large class who would gladly take advantage of them. They must be well built, and many domestic annoyances would be obviated. When in New York two years ago, he found a lift in the hotel in which he stopped, which was only an ordinary sized one; it was fitted up like a drawing-room, and was a great convenience. He saw no reason why there should not be a second-class lift for the servants and goods, and a first-class for the family and visitors. The suggestion to put ornamental glazed tiles on the outside of the walls he thought a very good one, and had seen very handsome effects produced by it in Lisbon, where it was quite common. He doubted, however, whether this style of building would accommodate more persons on the same area than at present.

The vote of thanks having been passed unanimously,

Mr. Roger Smith, in responding, said it was not necessary to notice all that had been said, as many of the objections advanced had been already met. Practically the case had been admitted which they had brought forward. They did not propose to alter the habits of all London, or even of a great portion, but there were large numbers to whom it was important to live in a certain locality, and to make the question definite they had dealt especially with one district; but he believed an equally strong case could be made out for the dwellings in many other quarters. In reply to the question put by Mr. Manuel, he thought the only way of insuring good building was that the persons engaged in it should build for investment and not for speculation. The circumstances under which the houses were built should be such that the builders should have an interest in the wholesome and satisfactory investment of their money, and then buildings would be put up substantially and with judgment. At present, the conditions under which most London houses were built were inimical to anything like solidity of construction. With regard to the number of persons to be accommodated on a given area, he believed that generally speaking it would be about double those under the present system. Of course there would not be so many bedrooms, nor such large offices in the basement; but taking it for granted that the tenants would be satisfied in convenient and comfortable sitting-rooms, and with as many bedrooms as were necessary for a moderate family, it would be possible for very nearly, if not quite, twice as many families to occupy a given site as at present. It was on that footing they rested the economy of the proposition, because both the erection and maintenance of the buildings, working the lifts, &c., would necessarily be more expensive. By having rent from a greater number, however, these expenses would be met, and greater comfort would be obtainable for the same outlay.

THE UNDERGROUND CABLE FROM HALLE TO BERLIN.

An innovation in telegraphy is being made in Germany which, to our knowledge, has not yet been attempted in this country (where underground telegraph lines have been laid in iron pipes), and which deserves notice on account of its novelty, consisting in laying down in the ground a cable resembling in all its details a submarine cable. Naturally, the undertaking has excited some amount of interest in Germany, not confined to telegraph circles alone.

According to the *Halle'sche Tageblatt*, the laying down of an underground cable, which is to connect the university town of Halle, in Saxony, a great centre of railway communication, with the capital of the empire (a distance of 22 German, equal to 103 English, miles) has just been begun. The cable includes seven wires, and, as already remarked, in its appearance resembles very closely the cables now immersed in oceans for connecting parts of the globe, all the latest improvements, which in telegraphic science especially are considerable, having been applied in its manufacture. It has been made by Felten & Guillaume, of Cologne, and is said to be a pattern of durability and finish. The seven conduits, each enveloped in gutta-percha, are laid closely together, and protected by a coating said to resist effectually the dampness and other injurious influences of the ground, not to mention any violence to which it may be exposed.

The cable will not be laid along the Anhalt Railway, which goes over Bitterfeld, Wittenberg, and Jüterbog, to Berlin, but along the old public high-road (*chaussée*). The latter route is considered the safest for the cable; here it will rest under a macadamised roadway, while along the railway it would be exposed to the danger of interruption by railway accidents, &c. The method of laying, too, as we shall see presently, is against the cable being laid alongside the line. As it will be about 3 ft. below the surface, this necessitates the digging of a trench of a length of over 100 English miles.

The works have been begun from Halle, under the supervision of an eminent government telegraph engineer, Baurath Wohlfahrt. The mode of laying down is described as follows. A couple of hundred navvies go in advance to dig the trench, the sole of which, as will be easily understood, must be made as even as possible. The navvies are followed by a column of six wagons. On the first are the measuring instruments, batteries, and apparatus; the next four wagons contain the cable, and the sixth is filled with liquid asphalt. The four wagons containing the cable, when filled, take up 800 metres (875 yards, or half a mile) of cable. The six wagons perform the laying with similar apparatus as is used on cable-ships. The uncoiling of the cable, its laying down in the trench, and the covering with asphalt, is a slow, sure, and regular process, which proceeds more slowly or quickly according to the nature of the road and the difficulties encountered. Only six miles (or twenty-eight English miles) of cable are at present ready for laying down; the manufactory, however, has undertaken the completion of the contract at the

stipulated time, so that no stoppage is to be expected in the work. The several lengths of cable of 800 metres are severely tested as to isolation and resistance before they leave the manufactory; great hydraulic pressure being applied to test its power of resistance.

The most difficult part of the work is the splicing of the cable sections, of which there will be over 200. The experience we have had in this country with submarine cables has taught us that everything depends on the nicety with which the whole length of the cable is spliced into a homogeneous whole. As there is a want in Germany of men familiar with this operation, highly experienced workmen have been especially engaged from England for this part of the work.

The first obstacle will be met with at Landsberg, between Halle and Bitterfeld, where the workmen will encounter porphyry, through which they will have to work their way. But greater difficulties are expected in the passage of the rivers Mulde and Elbe respectively. The laying of the cable across the Elbe will require special means being adopted for protecting it against the action of the towing chain laid down for the navigation of the river, which might otherwise destroy it in time. The experience gained at a recent accident of this nature will be made use of.

Herr Wohlfahrt is assisted in his work by two telegraph officials, who were sent by the German Postmaster-General, Dr. Stephan, in the beginning of February, to London to obtain all the information they could as to the electrical action of the cable, the required measurements, and the manipulation of the apparatus.

But it was especially necessary to gain the most exact information as to the mode of removing the so-called counter currents in the cable. As is well known, a certain amount of electricity is generated in cables, which, if it is allowed to remain, retards the electrical stream and confuses it to such a degree that the signs as they arrive becomes at first indistinct and then blurred, until they at last cease altogether. As soon, therefore, as the procedure of freeing the cable from the counter currents is perfectly known, its immersion is no longer problematical; the cable guarantees to us the unconditional security of telegraphic communication.

The laying down of this cable must be finished by the beginning of July, for the gutta-percha would deteriorate under the influence of great heat, thus injuring its capability of isolation. The laying down is estimated at 1,000,000 marks (50,000*l*.), and this sum appears small considering the length of the cable (over 100 miles), and the fact that at places with railway stations the cable will be brought into their telegraph offices. This is done mostly for the sake of detecting more quickly any disturbing influence in the cable, which sometimes leads to complete interruption.

ARCHITECTURAL ASSOCIATION.

AT the ordinary fortnightly meeting of this Association on Friday, the 31st ult., Mr. H. L. Florence, vice-president, in the chair, the following new members were elected, viz., Messrs. W. H. Miles (of Spalding), J. M. Jones, and W. Hernaman Wooler. The thanks of the Association were given by acclamation to Mr. Darbishire for conducting the members over the new Peabody dwellings in Pimlico, as reported in last week's *Builder*; and it was announced that today (Saturday, the 8th) the Association would visit the new house now being built for Mr. Millais at Kensington-gate (close to the Albert Hall), from a design by Mr. Hardwick. The drawings of St. Alban's Abbey, by Mr. Neale (a member of the Association), who won the Institute Silver Medal this year, were exhibited on the walls. A letter (dated March 28th) was read from the Conference Committee of the Institute, announcing that the Conference would be held during the week commencing June 12, and inviting suggestions as to the papers to be read or the subjects to be discussed, such suggestions to be sent in before the 5th inst. As the time was too short to permit of any organised arrangements, it was decided to leave individual members of the Association to send in direct to the Conference Committee such suggestions as they might deem advisable. It was announced that the members' *soirée* would take place on the 21st inst.

Mr. H. W. Brewer then read a paper "On the Architecture of South Holland," which we have printed in full.

ENLARGEMENT OF THE ST. GEORGE'S WORKHOUSE AT CHELSEA, AND NEW CHAPEL AND INFIRMARY BUILDINGS.

NEW buildings of a very extensive character have for some time been in course of erection at the Workhouse in Fulham-road, Chelsea, jointly for the St. George's (Hanover-square) Union, and the parishes of St. James and St. Margaret, Westminster. The works include an enlargement of the workhouse, together with the erection of an entirely new chapel of large dimensions; and likewise extensive new infirmary buildings in separate blocks, covering a ground area of about two acres and a half in extent. The estimated cost of the several buildings, when completed, is about 110,000*l*.

The enlargement of the workhouse, which is now almost finished, consists of additional men and women's receiving wards; an extension of the male and female infirmary wards, carried up two stories above the ground-floor; a new block on the east side containing additional able-bodied wards, to accommodate 400 inmates, and which is 246 ft. long by 74 ft. wide, including a dining-hall one story in height, the main building containing two stories above the ground-floor. The dining-room runs the entire length of the main building, and is 15 ft. in width. The extensions further include new administrative offices, a new master's house, additions to the married inmates' department, to accommodate ten additional couples, together with a new engine-house.

On the open area in front of the workhouse buildings, with its principal elevation at the south side of Fulham-road, a new chapel, Early English in style, has been erected, to seat a congregation of a little more than 600. It is about 120 ft. in length, and 50 ft. in width. The Fulham-road frontage terminates with a gable, surmounted by a bell-turret and vane. In addition to lofty three-light windows at each end, and similar side-aisle windows, the nave is further lighted by clearstory windows. The principal entrance is at the Fulham-road frontage, with two other entrances on the east and west sides. The nave is 95 ft. in length to the chancel steps, and the chancel itself 15 ft. in length, making the entire length of the interior, 110 ft. Five arches on either side divide the nave from the aisles. The circular arcade columns are in Dumfries stone, with red brick arches. The external as well as the internal walls are in stock brick, with red brick bands. The floor levels of the chancel and table are raised considerably above that of the nave, from which they are approached by a flight of five steps. The organ-chamber is on the east side, and the vestry on the west side, of the chancel; and at the north end, over the Fulham-road entrance, there is a gallery 15 ft. in depth. The whole of the carpenter and joiner's work in the interior, including the open ceiling, and the benches, pulpit, and other fittings, is in stained pitch-pine.

The new infirmary in course of erection is situated on a piece of ground immediately adjoining the workhouse buildings, and which, as already stated, is two acres and a half in extent. It is on the pavilion plan, and will consist of seven blocks. The Fulham-road frontage is 160 ft. in length, the several blocks being carried to a depth southwards of 600 ft. The Fulham-road elevation has a tower and turret with vane, carried to a height of 140 ft.; and at the east and west angles of the tower there are pinnacles. At the top of the tower there will be a large cistern, with a capacity to contain several thousand gallons of water. There are two entrances from the Fulham-road frontage,—one to the blocks containing the patients' wards, and the other to the administrative department, a separate block on the extreme west side. The several blocks containing the wards consist of three stories in addition to the ground-floor, and are 60 ft. in height to the eaves. Each floor is 84 ft. in length from east to west, and 24 ft. wide; and, in addition to the wards, there are nurses' rooms, lavatories, and other conveniences, to every floor. The airing and recreation space facing the west, between the different blocks, is 60 ft. in width. The wards are approached by a corridor on the west side, running the entire length of the buildings. The administrative block contains the general offices, kitchens, stores, nurses' apartments, committee-rooms, and dispensary, and close adjoining are the washhouses and steam laundry. A new residence for the house-surgeon to the infirmary, having a covered communication with it, has been erected at the Fulham-road frontage; and a corridor on the east side of the infirmary, 80 ft. in length, and 6 ft. in width, connects it with the new chapel.

The architect is Mr. H. Saxon Snell; and the contractors are Messrs. Wall, Brothers. The works are being carried out under the superintendence of Mr. Walter E. Blake; and Mr. E. Thompson is clerk of works.

THE WORKS AT THE NEW VEGETABLE MARKET IN THE CITY.

THE preliminary works for the new Vegetable Market to be erected by the Corporation on the vacant land between Charterhouse-street and Snow-hill, and adjoining the new Poultry Market, are actively proceeding. Messrs. Holland & Hannen, the contractors for the foundations at 13,968*l*., commenced this portion of the work about a fortnight ago. They have a force of several hundreds of men employed, and upwards of twenty carts and horses in the excavations required, and they have already cleared away a large extent of earthwork between the east side, near the Poultry Market, and the Farringdon-street boundary, on the upper side, to the depth of about 20 ft. It is estimated that about 20,000 cubic yards of earthwork will have to be removed before the basement flooring—intended to be of concrete—and the foundation walls, can be proceeded with. The building is to be uniform in its external features with the two markets already erected, and will extend on the south side in a westerly direction to Farringdon-street, in a line with the south boundary of the Poultry Market. Between the south boundary and Snow-hill and King-street a new street leading out of Farringdon-street will be constructed on the vacant land, and will give access from the last-named street to all the three several markets on the south side in a manner similar to that by which the markets are now entered from Charterhouse-street on the north side. The new street will cross over the Metropolitan and London, Chatham, and Dover Railway at the point where the lines diverge respectively to Moorgate-street and Farringdon-street Stations. A considerable extent of property on the east side of the railway has already been cleared away for the purpose of continuing the new street in that direction. The new market will occupy an area of upwards of two acres in extent.

TITHE RENT-CHARGE.

SIR,—My attention has been called to a letter signed "Rector's Tax," in a recent issue, and being aware that the provisions of the Act of Parliament in relation to the subject are very imperfectly known and understood, and as I have had some experience in connexion with these matters, I will endeavour to give a few particulars bearing upon the question, in the hope that they may be of interest, and perhaps of service, to some of your readers.

After the passing of the Act for the Commutation of Tithes in England and Wales (6 & 7 Wm. 4, c. 71), rent-charges in lieu of tithes were fixed upon the land, in certain cases, in the form of gross sums upon estates or holdings, or, as perhaps is more frequently the case, in the form of separate sums upon each field or close of land, the same being shown on the Tithe Map, and fully set forth and described in the tithe apportionment of each parish.

It is enacted that no person shall be personally liable for tithe rent-charge, the same being recoverable by distress on the land subject to the payment thereof, a restriction being placed upon the arrears recoverable at two years only.

When, in consequence of building operations, or from other causes, a field has become divided into numerous plots, the property of different owners, it should be understood that the only legal course is for the tithe-owner to collect the rent-charge from any part of the land, he having no right to constitute himself an apportioner. It then rests with the owners of the land to avail themselves of the powers which the Act affords either to effect an altered apportionment of the rent-charge, or to relieve the land altogether from the charge by redemption.

Where land charged with rent-charge has been divided into plots of such a size that the fair contribution of each towards the rent-charge would be at least 5*s*., the owners will find it convenient to have an altered apportionment made, the cost of which would be charged amongst all

the owners in rateable proportion to their respective interests.

Where, on the other hand, the fair contribution would be less than 5s., the owner of any one of the subdivisions may apply to the Commissioners to order the redemption of the rent-charge, and they have power to enforce contribution towards the redemption money and expenses, which, as in the case of the expenses of an altered apportionment, are spread over the entire plot, each owner being responsible for an amount proportionate to the area of his holding.

I frequently find that owners are deterred from availing themselves of these remedies, simple though they are, by a vague feeling that by so doing they may render themselves responsible for more than their fair proportion of the expense of the transaction; but, in all cases, these are borne by the owners *pro rata*, the applicant incurring no additional expense whatsoever.

HARLEY M. GRELLIER.

SIR,—Your correspondent, "Rector's Tax," in the *Builder* of the 25th ult., is much exercised because he is called upon to pay the rent-charge on the original inclosure. If he will apply to the Tithe Commissioners for England and Wales, 3, St. James's-square, S.W. (by letter), they will send him a form to fill up, stating that the ground has been sub-divided, &c.; whereupon the Commissioners will put him in the way of getting the rent-charge redeemed, and every landowner will have to pay his own share in proportion to the area of his property.

Your correspondent is wrong, however, in supposing that tithe-rent charges are any one's tax, as tithe-rent charge is an incorporeal hereditament, and as such is chargeable with property-tax and poor and other rates. A little reflection will show that, if upon the cutting up of a field for building, the tithe-owner had to collect the tithe rateably from some scores or hundreds of people, it would be equivalent to his property being confiscated. Let him remember, also, that if a field of ten acres pays a rent-charge of 3*l*., when that field is cut up and built upon, and is decupled in value, the tithe-owner gets no more tithe than before. If your correspondent has any difficulty in filling up the form which the Commissioners will send him, he should seek the assistance of some local surveyor, or the local tithe collector.

RECTOR'S PROPERTY.

MANOR PARK CEMETERY CHURCH COMPETITION.

SIR,—Referring to the *Builder*, of the 18th ult., I have observed that *two* tenders are inserted therein, viz., Brass, 2,835*l*.; Staines & Son, 2,083*l*. As no tender was accepted, and as the shareholders in this company may be misled by the above, I beg to say that a tender from Mr. J. Winters, amounting to 2,165*l*. had been received and accepted for erection of the church previously to the publication of the first-named amounts.

J. W. DUNCAN, Secretary.

BRISTOL CATHEDRAL NORTH PORCH.

SIR,—In your notice of the so-called ecclesiastical difficulty at Bristol, which has arisen out of the sculpture recently placed on the new north porch, there is a statement to which, as sculptor of the statues, and imputing as it does to me direct plagiarism in the execution of one of them, I should be obliged if you would permit me to refer. You rightly inform your readers that exception has been taken to St. Gregory because of his being represented as wearing the tiara; but when you go on to say that "the figure is, in fact, an exact counterpart of Pope Gregory, now being erected at the new Roman Catholic Cathedral at Clifton," this is so far devoid of fact that I must beg to give it direct denial. There is no such statue, I am told, at the Roman Catholic Cathedral, and if there were, I must still disavow the fact of mine being an exact counterpart of it; for, never having seen either the church at Clifton or one single work destined for it, and not having copied from any source whatever, the thing is impossible. My statues were approved by Mr. Street as original works, and have no resemblance to other works, only so far that each has the distinguishing costume and emblems allowed by the traditions of art; and the attributes of St. Gregory, by which he is recognised as one of the four Latin Doctors, seem to have been wrongly interpreted by a certain section of the Church at Bristol as only pointing to Rome, in which idea these objections appear to be singular, for on other English churches the figure of St. Gregory has often been erected (on two other cathedrals by myself) where he has been accepted, as he was intended to be, simply as one of the great fathers of the Church.

J. F. REDFERN.

THE HEALTH AND SEWAGE CONFERENCE.

SIR,—A paragraph has appeared this week in some of your contemporaries having reference to an intended conference to be held by the Society of Arts, in May next, on the "Health and Sewage of Towns." It is stated that a circular asking for information has been issued to the mayors, town clerks, chairmen, and medical officers of the various sanitary authorities.

Now, every person interested in sanitary matters must hope that the conference will be productive of good, but I cannot help thinking that to apply to the above-named officials for such information, entirely ignoring the surveyors to the authorities, from whom alone a reliable description of the method, cost, &c., of sewage disposal in their respective localities can be obtained, is scarcely a practical way of going to work; nor does it, I think, tend to give our surveyors their share of the honour due to those who do so much towards increasing the health and happiness of their fellow-creatures. I have seen one of the circulars, and noticed that nine-tenths of the queries in it applied directly to the surveyor's department. I also happen to know that in the case alluded to the surveyor furnished almost all the needful replies, and I have little doubt that the like will be done in one form or another in nearly every town. I venture to ask space for these few remarks, as I think it may be of service to call the attention of your readers to what is, in my humble opinion, one of the many causes conducing to the imperfect understanding of the sewage difficulty which prevails, even among those who, from the most valuable praiseworthy motives, devote much time and attention to the subject.

C.

MASTERS AND MEN.

Birmingham House Painters.—On the 1st of December last the operative house-painters of Birmingham gave their employers notice for an advance of ½d. per hour upon their wages of 7d. per hour, the same to come into operation on the 1st of April of the present year, and not being able to settle the matter without arbitration, it was referred to Mr. T. C. S. Kynnersley, who, on the 17th ult., awarded as follows, namely, ½d. per hour on the 1st of April, 1876, and another ½d. on the 1st. of April, 1877, the reason assigned for so dividing the halfpenny being that some of the employers had entered into heavy contracts in the early part of last year on the basis of wages at that time, and some of which contracts now stand in abeyance.

Northampton Plasterers.—The members of the Northampton District of the National Association of Operative Plasterers met to celebrate their first anniversary on the 27th ult. On the same day a four months' notice expired for an advance of 1d. per hour on the wages, which was acceded to by the employers, so that their wages will, in future, be 7½d. per hour, instead of 6½d.

Dublin.—A meeting of delegates, representing the carpenters employed at some of the principal builders' yards in this city, has just been held at the rooms of the Amalgamated Society of Carpenters and Joiners, Wellington Quay. Mr. Hearns occupied the chair. It was resolved, on the motion of Mr. Foley, seconded by Mr. Hayden, "That, taking into consideration the many friendly advances which have been made to the societies whose members, by exceptional principles of combination, compel those who do not agree with them to keep from seeking work in any employments, without success, that we use our best endeavours to make our grievances known to the public, and that we solicit the co-operation of all carpenters who feel aggrieved."

VARIORUM.

DEBRETT'S Peerage, Baronetage, Knighthood, and Titles of Courtesy are this year published (by Dean & Son) in one thick, but not at all inconvenient, volume. The work has obtained so eminent a character that commendation is unnecessary. Debrett's House of Commons and the Judicial Bench, 1876, form a separate volume, compiled by Dr. R. H. Mair. It includes 1,000 armorial bearings, and a large amount of cognate information.——Those who require a Peerage, Baronetage, and Knightage at less cost may safely obtain the little shilling volumes published by Hardwicke & Bogue. It is a recommendation to say that they are edited by Mr. Edward Walford, M.A.—— "Landlord and Tenant":—The *London and Provincial Illustrated Paper* says:—"Yearly, quarterly, and indeed other tenants will be glad to notice that there is some prospect of getting a clear legal decision about the precise allegations of landlords as to keeping houses in 'tenantable' condition when there is no exactly-worded clause (applicable to the question) in the agreement. At present there is a conflict of authorities, and the whole subject is in the greatest confusion. In the case of Lady Winchelsea and the trustees of Mr. Hall, Mr. Justice Quain has decided that a landlord is under an implied covenant to keep the house he lets in good sanitary condition. The case will, however, come before the judges *in banco*, where we may reasonably hope the arguments and the decision will settle, more or less directly, a good many points concerning which both landlords and tenants are now in doubt. The sanitary condition of a house is a very wide matter, and covers a great variety of details."——*Leisure Hour* deals with British Lighthouses:—"The lighthouses of this country are under the management of three distinct boards, incorporated by Act of Parliament. The Trinity Board, having its head-quarters in London, conducts all affairs relating to the coasts of England; the Board of Commissioners of Northern Lights, having its head-quarters in Edinburgh, attends to all matters connected with the coasts of Scotland; and the Ballast Board of Dublin, having its head-quarters in Dublin, looks after all matters relating to the coasts of Ireland. A royal Commission appointed to inquire into the condition of the British lights in 1861, reported to Parliament very favourably, and especially regarding the Scottish lights. Here it may be mentioned that, although the Northern Lighthouse Board consists chiefly of members of the legal profession, it has always had in its service officers of high scientific attainment and practical skill in all matters relating to lighthouse engineering and duty. The name of Stevenson is well known to all who have taken any interest in lighthouse matters. Robert, the father, built the well-known tower on the Bell Rock, the light of which was first exhibited in February, 1811; Allan, the son, built the classic tower on the wild rocks of Skerryvore, the light of which was first exhibited in February, 1844; David and Thomas, the present engineers to the Board, lately erected the substantial tower on the savage rock of Dhu-Heartach, fifteen miles S.S.W. of Iona."

Miscellanea.

Unsanitary Condition of the District West of Hull.—At a recent meeting of the Newington Board, whose jurisdiction is over the district west of Hull, Dr. Holden presented a report which he had prepared at the instance of the Government Inspector. The report showed an alarmingly unsanitary condition of the neighbourhood. The main street was reported to be surface clay, ploughed into ruts by carts, some ruts being 20 in. deep, proportionately wide, and full of water. He was informed one resident had had four children down in fever during the winter, and as medical men would not or could not come down the street, he had had to carry the children to a dispensary, thereby endangering their lives and the safety of the public. In one street a terrace had been completely deserted by its inhabitants in consequence of the general unsanitary condition of the place, and the increased expense of porterage for coals, &c. In an adjoining street the crown of the drain was so near the surface that carts had broken through, and the holes in the drains were merely covered with boards, &c. The medical officer stated he could certify certain houses as unfit for habitation. The whole of Beetonsville he considers is in a dangerously unsanitary condition, and that it is his duty to advise prompt action to remedy the evils he had faintly attempted to describe.

Civic Heraldry at Middlesbrough.—At a recent meeting of the Middlesbrough Town Council, the Mayor drew the attention of the Council to what is described by the *York Herald* as "an elaborate painting of the Middlesbrough Borough arms, which, enclosed in a gilt frame, was let into a panel over the Mayor's chair." He hoped they would accept it at his hands. There was a suggestion he would like to make, and that was, that some recognition ought to be made on the coat of arms of the staple industry of the town. He would not desire to remove the lion on the crest, because that connected them with the De Brus family, but he thought that the lion on the shield seemed rather out of place, and he would like to have blast furnaces on the shield instead of the lion. (!) Mr. T. H. Bell disagreed with the Mayor. They might as Englishmen say that the lion on their national coat of arms was out of place, and a sheep would better suit them. He must point out that the crest was a personal insignia, and that if they wanted to retain any connexion with the De Brus family, they must leave the lion on the shield. They might, however, if they liked, place blast furnaces in a canton or small square on the shield. The Mayor said that he had no strong feeling in the matter, and was content to leave it at present. He must, however, remind them that their coat of arms had no antiquity, having been manufactured for them in 1854.

Fall of New Barracks.—A serious accident has just occurred in Bordeaux. The north wing of the barracks called Alsace fell in with a dreadful crash. The building was five stories high, measuring some 80 ft., and the whole gave way in one vast heap of ruins. It was nearly completed, only five men being still at work on it.

Bedfordshire Archæological Society.—The quarterly meeting of this Society was held in the Bedford Library, when Mr. Wyatt laid on the table several Tradesmen's Tokens, presented by Mr. Ekins. They were found on a farm at Sundon, on which fragments of Mediæval pottery and other remains have also been discovered, indicating the proximity of the spot to the old Roman road. Mr. Hurst read a paper on the ancient Corporation of Bedford. After briefly noticing the various charters which have been granted to the town from the time of Henry II. down to that of Charles II., he proceeded to describe the origin of the different offices which obtained in the old corporate body, viz., those of bailiff, chamberlain, alderman, mayor, &c., recording many interesting details respecting the mode of electing these functionaries in bygone times. Quoting from Luigo Brentano's "History of Guilds," he showed that in all probability a guild merchant existed in Bedford at a very remote period, and that the town possessed municipal privileges long anterior to the time of Henry II. Mr. Wyatt subsequently read a record upon the Corporation maces from the "Bedfordshire Notes." The mayor's mace and those of the two bailiffs were exhibited at the meeting. They all date from the time of Charles II.

Enlargement of Charing-cross Railway Station.—The Parliamentary Committee on the South-Eastern Railway Company's Bill have considered this subject. Sir Edward Watkin, chairman of the Company, informed the Committee that it was proposed in the Bill to extend the Charing-cross Station by erections on the east side of Villiers-street. For this purpose the company had purchased the requisite land at a cost of 50,000*l*. To connect the new buildings with the existing station a bridge of an ornamental character in the form of a covered gallery was intended to be constructed across Villiers-street from the side of the hotel, and in order to avoid interference with the traffic of the thoroughfare, it would be carried at a height of 31 ft. from the level of the roadway. Mr. Brady, the company's engineer, said his estimate for the erection of the bridge was 1,100*l*. The Metropolitan Board of Works and the Vestry of St. Martin's parish opposed, and called evidence to show that the construction of the proposed bridge was an unnecessary work, and would be a public eyesore. The Committee declared the preamble proved, subject to a clause being inserted to ensure the construction of the bridge in accordance with the views of the Metropolitan Board of Works.

Ascot Grand Stand.—Since the last race meeting at Ascot the old wooden and thatched building, close to the high road, forming the entrance to the Grand Stand, which was built after a plan of the late Captain Seymour, one of the trustees, and was opened for business at the Spring Meeting in May, 1866, has been removed, and the trustees have had erected a new building, in the Italian style of architecture, consisting of a colonnade of nine arched openings, entering a hall 120 ft. long by 25 ft. wide, flanked at each end by pavilions, one containing the telegraph department, and the other devoted to apartments for the officials belonging to the Grand Stand. The approach from the Central Hall to the lawn and Grand Stand is through an arch of 22 ft. span, and connecting the new building with the iron verandah. On each side of this arch are the money-takers' offices. The materials of the building are red brick with stone dressings; the capitals of the piers, the arches, and the entablature are of stone, surmounted by an ornamental balustrade. The entire building is 160 ft. long and 25 ft. wide. The central portion is paved with coloured tiles, and the ceiling divided into bold panels of wood, stained and varnished. The architect is Mr. B. Ferrey, and the building has been erected by Mr. John L. Hollis, of Windsor.

Belfast Architectural Association.—A meeting of the above society was held on Monday evening, 27th March, at the Museum, College-square North. There was a large attendance of members. Mr. Conway Scott, B.E., occupied the chair. A paper entitled "Some Notes on Construction" was read by Mr. L. Livingstone Macassey, C.E. Mr. Macassey, in the course of his remarks illustrated by diagrams on the black board the various precautions necessary for the insurance of sound construction in foundation, walling, &c. The proper use and formation of concrete was described, and the recent experiments of Mr. Cotton, of Dublin, with regard to concrete in the form of beams explained.

Monumental.—A bronze statue of the late Lord Rosse has been erected in the principal street of Parsontown, Dublin. It is one of the latest of Foley's works, and a good specimen. The late Earl is represented as standing in his robes as Chancellor of the University of Dublin, wearing also the collar and badge of the Order of St. Patrick. The pursuit in which he attained celebrity is indicated by the addition of a globe, on which one hand is resting. The statue is 8 ft. in height, and stands on a pedestal 8 ft. 6 in. high. It is an excellent likeness. It was cast at the works in Manor-street, Chelsea, where we saw it before its departure.——A tablet of black and white marble has just been placed in the Wesleyan Methodist Chapel at Heanor, to the memory of Mrs. Martha Smith, of Heanor Hall, and of Dr. Edward Smith, F.R.S., of Heanor Hall, and Harley-street, London, son of the above. The commission for its erection was placed in the hands of Mr. J. B. Robinson, of Derby.——The statue of Sir James Simpson, for Edinburgh, has been cast at the Manor Iron-works. The statue is by Mr. Wm. Brodie, R.S.A., and will be erected in Princes-street.

New Hospital at Helensburgh.—A new hospital at Helensburgh, near Glasgow, has just been erected by the magistrates and town council, principally from funds bequeathed by the late Miss Ann Alexander. The architect is Mr. W. N. Tait, of Glasgow, whose plans were selected in competition. The new hospital is built in the villa or cottage style of architecture, having gable tops over the centre or administrative department, and with corner wings for lavatories and water-closets, the front ones being relieved by tower roofs. The hospital combines under one roof a fever hospital; a hospital for infectious diseases other than fever, principally intended for small-pox; and an ordinary hospital, intended for non-infectious cases, or as casualty wards. Each has a separate entrance and distinct airing-grounds. The works were executed by the following contractors:—Mason-work, Messrs. Shaw & Campbell, Glasgow; joiner-work, Mr. George Buchanan, Helensburgh; slater-work, Mr. James Forsyth, Helensburgh; plumber-work, Mr. Wm. M'Kinlay, Helensburgh; and plaster-work, Mr. Allan Armit, Helensburgh. The total cost has been about 3,000*l*.

Buckingham Borough Surveyorship.—A special meeting of the members of the Buckingham Town Council and Urban Sanitary Authority was held on the 27th ult., to receive applications from persons willing to undertake the duties of borough surveyor. Three applications were read,—from Mr. J. T. Beards, Maidsmoreton, 80*l*.; Mr. R. W. Munday, Buckingham, 50*l*.; and Mr. Wm. King, Gawcott, 45*l*. A letter was also read from the late surveyor, expressing his approval of the appointment of a practical working surveyor, and mentioning a person named Allen as fully capable to undertake the duties. It was, however, considered by the council that they should adhere to the terms of the advertisement, which stated that the surveyor should keep his own accounts, and this it was stated Allen could not do; and, therefore, his name and that of King was passed over. It was resolved unanimously "That Mr. R. W. Munday be appointed, at the annual salary of 50*l*. The duties to commence at once."

"A Principal Cause of Illegitimacy in Scotland."—"A Servant," writing to a Scottish paper, says,—"What I believe to be one of the principal causes, if not the principal, for the large amount of illegitimacy that prevails in the agricultural districts, is the want of proper accommodation for what in Kircudbrightshire we call the 'cotman.' This I consider to be the fountain-head of the evil. Moralists may cry shame at us, and preachers may cry out against this growing evil; but all the preachers in the world will be of no avail as long as cotmen are housed in the manner they are. The stream cannot rise above its level nor be purified in its flow if bitter waters proceed out of the fountain; and as long as cotmen's children (for in time it is they that become the agricultural labourers), boys and girls, father and mother, are huddled together for the want of house-room, and as long as landlords are content to let the cottages on their estates remain as they are, just as long will the agricultural districts be festering with the immoral plague of illegitimacy."

Skelton Wesleyan Chapel and Schools Competition.—A Darlington paper states that the successful plans in this competition were those sent in by Mr. Neil Macara, architect, Darlington.

"Steeple Jack" at Dundee.—About a month ago, part of the masonry beneath one of the dormer windows of the spire of St. Paul's Free Church, Dundee, fell to the ground, owing to the corrosion of the iron cramps with which the work was fixed. It was thereupon determined by the managers of the church to thoroughly repair the spire, and Messrs. Goodchild, Moir, & Co. were employed to execute the work, which has now been safely accomplished. To enable the work to be done without scaffolding, it was necessary to secure a tackling of ropes and pulleys to the top of the spire, which is about 150 ft. high. The ordinary method of reaching the top of such lofty buildings is by flying a kite over them, but the weather was unfavourable for such an operation. After consultation with Mr. Goodchild, Mr. Moir resolved to reach the top by ladders. The fixing of the hoisting tackle over the top of the spire occupied two days. The finial was strengthened, and a new lightning-conductor fixed.

An Extensive Brickmaker.—The Bill for the proposed Maidstone and Sittingbourne Railway was before a Select Committee of the House of Commons a few days ago. One of the witnesses examined on behalf of the promoters was Mr. Smeed, of Gore Park, near Sittingbourne, who said he had lived all his life in the neighbourhood, and was one of the largest landowners in the district, including a quantity of valuable brick earth. He supported the Bill, notwithstanding that it passed through his brick land. He made more bricks than any two other persons engaged in the trade, and at the present time was paying about 2,000*l*. in weekly wages. He now sent bricks to Maidstone by water, and had barges of his own. If the projected line was made, he should make considerable use of it, but not so much as other brickmakers who did not possess barges. In cross-examination by Sir Edmund Beckett, Mr. Smeed said he exported bricks to India and China, and sent as many as a million a year to Maidstone.

The Sewerage of the Potteries.—Sir Henry Cole met at Stoke, on the 27th ult., a number of delegates from the local governing bodies in the Potteries, and discussed with them the sewerage question as it affects that district. Sir Henry appeared as the advocate of the Scott Sewage Company, and offered its services to those towns which, as he tersely put it, "desired to be clean at the least expense to the ratepayers." As the Duke of Sutherland is at the head of this company, as Sir Henry was accompanied by the agent on the Trentham Estate, and as, moreover, he reiterated that proceedings would certainly be taken by the Duke against Hanley, Burslem, and Stoke as they had been against Tunstall and Newcastle, the visit had a significance which it might not otherwise have possessed. At the suggestion of Sir Henry, a resolution was passed affirming that present plans for individual towns should be devised with a view to their being utilised if, in the future, a general scheme for the entire district be decided upon.

The History of Egypt and the Bible.—The Victoria (Philosophical) Institute held its usual fortnightly meeting at 10, Adelphi-terrace, on Monday, when Mr. Howard, F.R.S., read a paper on the "History of Egypt in connexion with the Bible." He stated that he wished, without dogmatism or assumption, to trace the bearing of recent researches on the historical accuracy of Scripture. He examined the history of Egypt as showing, from Menes downwards, that *man* was in possession of the same faculties, as indicated by his high civilization and distinctly religious tendencies. The dates were, on the admission of the best authorities, in a state of deplorable confusion at present. The religion of the country was shown to have included grand truths of primitive revelation and precepts of excellent morality, but the priests kept the best of their knowledge to themselves; the bulk of the people were sunk in idolatry, the chief influence for good being connected with the descendants of Shem, especially the Israelites.

Society of Engineers.—On Monday evening, the 3rd of April, Mr. V. Pendred, president, in the chair, a paper by Mr. J. Steel on "Air Compression," was read. The author pointed out the necessity of placing air compression on a proper basis, as, whether an economical mode of using power or not, in mines, chemical works, diving-bells, raising ships, and other operations, it had become a necessity. It was also to be regarded as an alternative from the cost and waste of horse-flesh to propel tramway cars.

Working Men in New York.—The *New York Times* states that a recent careful investigation into the condition of the labour market in that city shows that the mechanical industries have not recovered from the depression caused by the financial panic of 1873. "The trade-unions now number only about one-third of their total strength three years ago. This is specially to be seen in the building trades, the societies in 1873 numbering over 10,000, while at the present time the number on their rolls in good standing is not much above 3,000. In 1873 the various unions had 48,180 members, while at the present time they contain less than 18,000, of which 3,790 are out of employment. A careful estimate of the workmen outside of trade organisations shows the probable number to be 58,350, of whom 21,420 are idle. The plumbers, gas-fitters, painters, and those engaged in the building trades appear to have suffered most. In some of the departments of the iron trade the manufacturers have succeeded in maintaining full forces and full prices. Of those who have suffered, the stove-makers have perhaps fared the worst.

Operatic Society.—Some of our readers may like to know that Signor Gilardoni (32, King-street, W.), with the view of supplying a want long felt by amateurs, as well as by those studying for the musical profession, is forming a society for the practice of operatic music, with the immediate object of affording the members an opportunity of appearing from time to time in Italian and English opera, with costumes and full orchestra, under his direction. Rehearsals will be held weekly in a suitable hall, and it is contemplated to produce three operas in the course of the season; in addition to which two or three evenings will be set apart for *soirées musicales*. A successful public rehearsal of Beethoven's "Fidelio," English version, was recently given at the Royal Albert Hall Theatre, and it is to be performed early in May, with complete appointments.

New Cemetery at Wimbledon.—The Wimbledon Local Board are about to construct a new cemetery for the use of the parish, at a cost of 6,000*l*., exclusive of the land, and the contract for laying-out and draining the ground has just been taken by Mr. Crockett, who will enter upon the works immediately, the estimated cost of this portion of the undertaking being 2,000*l*. The ground which the local board have secured for the purposes of the cemetery is twenty acres in extent, but only ten acres are to be laid out for the present, the remaining ten acres being reserved for the extension of the cemetery whenever it may be required. The site consists of a plot of ground in an elevated position, on the east side of the district, abutting on the South-Western Railway, and about a mile from the Wimbledon Station.

Blackburn.—The Wesleyan Methodists of this town, a short time ago, purchased a large plot of land at the junction of Preston-road and Montague-street, for the purpose of erecting a chapel. Invitations were sent out to the following architects for plans:—Mr. Wm. Waddington, Burnley; Mr. C. O. Ellison, Liverpool; Mr. William S. Varley, Blackburn; Mr. Proctor, Bolton; Messrs. Woodhouse & Potts, Bolton; and Messrs. Maxwell & Tuke, Bury. Plans have been received from the four first-named gentlemen, and, after considerable consideration, the committee have resolved to entrust the work to Mr. William S. Varley, Blackburn. The accepted design is a Gothic building, with tower and spire, and will seat upwards of 1,000 worshippers. The great fall in the land from front to back has been utilised by placing a large school and vestries under the chapel floor.

Public Works in Cochin.—Mr. Henry W. Hudson, late of the engineer's staff, Great Northern Railway, King's-cross, has been appointed Chief Engineer of Cochin, in succession to Mr. Macdonald, who held charge for a few years. We learn from the *Madras Mail* for February 17th last, that the Cochin State, with a revenue of twelve or thirteen lakhs, spends 250,000 rupees for public works in each year. The newly-appointed engineer is likely to undertake some large works which are necessary for the improvement of communication between the different parts of the province.

The Fitzwilliam Museum, Cambridge.—The election of a director of the Fitzwilliam Museum took place on the 1st inst. There were eight candidates. Mr. Colvin, of Trinity, at present Slade Professor of Fine Art, was elected.

Winchester Cathedral.—A small reredos, in Derbyshire alabaster and Dove marble, the design and work of Mr. N. Hitch, architectural sculptor, has just been placed in the Lady Chapel of Winchester Cathedral, at the cost of the Dean. The reredos is a composition in three divisions, the centre being occupied by a white marble cross within an alabaster vesica. The outer divisions are richly diapered with lilies and roses. The cornice is of Dove marble, and carved with the fruit and foliage of the pomegranate, whilst the "retable" is a projecting slab of the same marble. The Dean and Chapter have also, within the past week, had placed within the communion-rails a pair of metal standards of thirty lights each, with crystal and decorated metal ornaments, the gas from which will illuminate the entire area of the presbytery, and obviate the use of the jets round the pillars and along the cornice beneath the mortuary chests of the Saxon kings.

Lightning.—A thunderstorm passed over the village of Snettisham, which is situated within three miles of Sandringham, recently. The electric fluid from this discharge struck the spire of the fine old parish church in two places, on the south-eastern side in the upper portion and on the north-western in the centre, effecting deep incisions, and hurling some of the massive stones a considerable distance. The current appears then to have passed through the belfry, tearing up the flooring and destroying pinnacles and coping in its course. Finding its way into the vestry, and thence into the church, it has left traces of seeking various outlets, but ultimately it passed out beneath the western door.

New Offices for the Board of Trade, Southampton.—A new building has recently been erected near the Docks and Custom House, Southampton, for the Board of Trade. The offices comprise rooms for the superintendent, officers' waiting-rooms, cashier's and general office for paying off crews and carrying on the business of a seamen's savings-bank, engaging-room (where seamen are mustered before signing articles), surveyor's offices, examination-room for engineers and officers, emigration offices, &c. The whole of the offices are heated by hot water, the apparatus being capable of regulation in each room. The building was erected from the designs of Mr. Giles, the Dock Company's engineer.

Co-operative Stores at Gloucester.—The Gloucester Co-operative Society has decided to purchase a plot of land at the corner of Brunswick-road, facing Clarence-street, and to construct three shops in which to carry on the drapery, boot and shoe, and ironmongery and hardware departments. The new building will be of Bath and Forest stone, with three gables fronting Barton-street, one on the angle between Barton-street and Brunswick-road, below which will be an illuminated clock, and another gable in Brunswick-road, terminated with crocketed finials. The style will be Gothic. Messrs. Medland & Son are the architects.

Discovery of Wall Paintings in New Zealand.—An interesting discovery is said to have been made by Dr. Von Haast, in Canterbury, New Zealand. In the course of his explorations he came upon a shallow cove, the limestone walls of which were covered, for a space of about 100 ft. by 5 ft. high, with remarkable drawings apparently of antiquity. Dr. Haast had all these drawings carefully copied, and the information in detail will shortly be published. There are three distinct sets of drawings, the oldest of them in red, the others in black. The scaling off from the surface of the limestone rock affords proof of the antiquity of the work.

Marble Mosaic Pavements.—The mosaic pavements laid down in the new bank erected for Messrs. S. Smith & Co., in Derby, and one in the new bank erected in Worcester, for the Stourbridge and Kidderminster Company, both mentioned by us on previous occasions, were executed by Messrs. Burke & Co., of Newman-street, Oxford-street. Messrs. Burke have made the revived ancient system of marble mosaics, *opus incertum*, a specialty, and have a large staff of Venetian workmen qualified for the work. This mode of flooring might often be advantageously resorted to instead of tiles.

Memorial Chancel Screen at Sneinton.—It is proposed to erect an oak chancel-screen in the parish church at Sneinton, Notts, in memory of the late Rev. W. H. Wyatt, vicar of the parish for thirty-one years. A design by Mr. Truman, architect, has been accepted.

National Health Society.—The committee have arranged a course of lectures to be given under the auspices of the National Health Society, in the rooms of the Social Science Association, Adam-street, Adelphi. This is the list:—Mr. H. C. Bartlett, Tuesday, April 11th, "The Chemistry of Every-day Food"; Miss Florence Lees, Wednesday, May 10th, "Nurses for the Sick"; Miss Miranda Hill, Wednesday, May 24th, "The Influence of Beauty on the Life and Health of the Nation"; Dr. Samuel Wilks, Wednesday, June 7th, "Our Predisposition to Special Forms of Disease"; and Mr. Eassie, Wednesday, June 21st, "Healthy Houses."

New Workhouse Infirmary, Manchester. At the meeting of the Manchester Board of Guardians on the 30th ult., it was stated the Infirmary Building Committee had considered the following tenders which had been sent in, viz.:—Mr. Samuel Warburton, 91,800*l*.; Messrs. Robert Neill & Sons, 94,300*l*.; Mr. William Southern, 96,500*l*.; Mr. Edward Johnson, 98,480*l*.; and Messrs. Thomas Clay & Sons, 101,900*l*. After much careful consideration, and consultation with the architects, the committee had resolved to recommend that the tender of Messrs. R. Neill & Sons should be accepted by the Board. This recommendation was adopted.

Royal Italian Opera.—"Les Huguenots," given with complete *ensemble*, is always a delight, difficult as it is on the part of those who knew Grisi and Mario in the opera to avoid damaging comparisons. At Covent Garden, on Monday night last, Signor Carpi fully maintained the good opinions he won last season in "Lohengrin"; and Mdlle. d'Angeri (*Valentina*) did more, for she showed increased power and impressiveness. Mdlle. Bianchi was as good a *Margherita di Valois* as could be desired.

Association of Municipal and Sanitary Engineers and Surveyors.—The next meeting of the District Committee for the Midlands will be held in the Court House, Warwick, on Wednesday, the 19th of April. A paper on the Water Supply of Warwick, by Mr. E. Pritchard, Engineer to the Corporation, will be read and discussed, and the existing waterworks and pumping-engines will be inspected. This will be the last meeting of the committte, prior to the general meeting to be held in London.

Mr. and Mrs. German Reed's Entertainment.—A new second part is announced to be produced at St. George's Hall on the 10th of April, in lieu of "A Spanish Bond." The novelty, in which Mrs. German Reed, Miss Leonora Braham, Mr. Corney Grain, Mr. A. E. Bishop, and Mr. Alfred Reed, will appear, will be entitled "Grump's Ménage," and is from the pen of Mr. John Hermitage, with music by Mr. Fred. E. Barnes.

Society for the Encouragement of the Fine Arts.—At the last meeting of this society, Mr. J. Forbes Robertson, well and appreciatively known in literary circles as an art critic, lectured on "Art in 1476." Mr. Tom Taylor was in the chair. There was a good audience, and a lively discussion afterwards.

Proposed International Exhibition, Paris.—It appears to be definitely settled that an International Exhibition shall be held in Paris in 1879. A decree has been issued to organise a commission of forty-five persons to carry it out.

A House in Berlin.—Lord Odo Russell, the British Ambassador in Berlin, is said to be in negotiation with the new proprietor of the handsome mansion in the Wilhelmstrasse, lately the property of Dr. Strousberg, for a ten years' lease of that building, at a rent of 2,500*l*. a year.

TENDERS

For a dwelling-house in the Southgate-road, Winchester. Mr. A. W. Galbraith, architect. Grates and chimney-pieces to be provided by the building owner:—

Crook	£1,225	0	0
Marsh	1,050	0	0
Bell & Ayling	995	0	0
Carter & Son	956	0	0
Beavis	878	0	0
Allen (accepted)	735	0	0

Accepted for a new vicarage, at Lumb, in Rossendale. Quantities by the architect, Mr. Harry T. Percival:—

Maden Bros. (masons)	£686	15	0
Whittaker (joiner)	325	0	0
Kay (plumber)	145	0	0
Rushton (slater)	106	10	0
Lord (plasterer)	85	0	0

For alteration and repair at No. 20, South-terrace, Littlehampton:—

Colwell	£800 0 0
Cheesman	760 0 0
Snewin	500 0 0

For alterations and additions to the Wesleyan Chapel, at Bardney, Lincoln. Mr. James Thropp, architect. Quantities supplied:—

Sims (in error)	£1,370 0 0
Close	1,198 0 0
Binns	1,090 0 0
Plowman & Son	1,050 0 0
Kendall	899 0 0
Slingsby	875 0 0
Hatoliff & Bell (accepted)	768 0 0

For alterations and additions to the Struggler Inn, Lincoln, for Messrs. Cartwright & Wilson, brewers. Mr. J. Whillon, architect. Quantities supplied:—

Crosby & Sons	£630 0 0
Taylor	600 0 0
Oller & Elsey	594 0 0
Sims	590 0 0
Housam & Son	583 0 0
Close	549 0 0
Kendall	534 0 0
Basker	522 10 0

For the erection of a proposed house at Malden, for Mr. R. A. Levie. Mr. T. J. May, architect:—

Croxford & Co.	£1,499 0 0!
E. & E. Smith	872 0 0
Vincent	823 0 0
Turtle & Appleton	780 0 0!

For new stables, coach-house, &c., at Pinewood, Witley, Surrey, for Sir H. T. Holland, bart., M.P. Quantities by Mr. W. H. Brayshaw:—

Burgess (accepted)	£833 0 0

For rebuilding No. 141, White Cross-street, St. Luke's, for Mr. John Knowles. Mr. J. W. Saunders, architect. Quantities by Mr. W. H. Brayshaw:—

Knight	£880 0 0
Burgess	689 0 0
Read & Son (accepted)	625 0 0

For restoration of Wellow Church, Notts. Mr. J. Birch, architect:—

	In Oak.	In Deal.
Hopkinson	£1,656 0 5	£1,378 12 6
Young	1,426 10 0	1,295 10 0
Clipsham	1,397 0 0	1,132 0 0

For the erection of Board school, at Newtown, for the (U. D.) Disley-Stanley School Board. Mr. J. A. Brown, architect. Quantities supplied by Messrs. Taylor & Jackson:—

Goddard	£2,500 0 0

For alterations and additions to the Up Hill Post-office, for Mr. Lillburn. Messrs. Drury & Mortimer, architects:—

Sims (accepted)	£178 0 0

For the construction of brick sewers, with manholes and other works, for the Cadogan and Hans-place Estate, Limited. Second contract. Mr. J. Ashdown, engineer:—

Jackson & Shaw	£9,350 0 0
Nowell & Robson	8,866 0 0
Pearson (accepted)	8,600 0 0

For premises in Charlotte-street, Finsbury, for Mr. J. K. Farlow. Mr. R. P. Notley, architect:—

Morter	£1,264 0 0
Faulkner	1,245 0 0
Greenwood & Sons	1,235 0 0
Browne & Robinson	1,190 0 0
Hart	1,187 0 0
Newman & Mann	1,136 0 0

For trimming-up and gravelling roads and footpaths at Kilburn, for the British Land Company, Limited:—

Keeble	£2,558 0 0
Dunmare	1,685 0 0
Bloomfield	1,658 0 0
Killingback (accepted)	1,560 0 0

For alterations at Highbury New Park Tavern, for Mr. Joseph Hough. Mr. Chas. Strange, architect:—

Moore	£277 0 0
Sabey	267 0 0
Vivian	250 0 0
Smale & Taylor (accepted)	247 0 0

For the erection of stables, for the Vestry of St. Giles, Camberwell:—

Oliver	£850 0 0
Cullum	725 0 0
Battley	621 0 0
Harris	598 0 0
Fisher	590 0 0
Thompson	582 0 0
Downs & Co.	570 0 0

For the erection of schools at Moseley village, for the Wednesfield School Board. Mr. W. D. Griffin, architect:—

Clark	£1,670 0 0
Groves	1,611 13 0
G. & F. Higham	1,600 0 0
J. & W. Cockerill (accepted)	1,540 0 0

For rebuilding Chatham House, 13A, High-road, Knightsbridge, for Captain Mercier. Mr. A. Payne, architect:—

Reading	£2,427 0 0
Nash	2,375 0 0
Turrell	2,337 0 0
Brass & Son	2,300 0 0
Prout	2,300 0 0
Sholl & Jones	2,284 0 0
Stephenson	2,204 0 0
Staines & Son	2,145 0 0
Lee & Co.	2,131 0 0
Croxford & Co.	2,093 0 0
Wagner	2,047 0 0
Aitchison & Walker	1,977 0 0
Linfield	1,809 0 0
Lacy (accepted)	1,804 0 0

TO CORRESPONDENTS.

G. M.—J. T.—O.—W. S.—R. K.—A. G.—W. G. S.—Mr. R.—A. B. S.—M.—T. H.—C. H. L.—J. C.—R. M. B.—W. S. V.—E. S. C.—M. O. T.—Mr. H.—J. H. B.—H. M. G.—C. S.—J. F.—H. M. C.—H. J. J.—J. A.—P. H. B.—F. P.—A. B.—A. S.—W. G. D.—W. T.—A. H. A. (please send particulars).—Quondam (in type).—F. W. C. cannot undertake to do our correspondents' "sums".—W. B. (next week).—T. B. (next week).—J. J. S. (next week).

We are compelled to decline pointing out books and givin addresses.

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

NOTICE TO ADVERTISERS.

GOOD FRIDAY.

"THE BUILDER," for the week ending APRIL 15th, will be published at ELEVEN a.m. on THURSDAY, 13th instant. Advertisements for insertion in that Number must therefore reach the Office **before THREE p.m.** *on WEDNESDAY, the 12th.*

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RANDELL, SAUNDERS, & Co., Limited.